approach

MARCH 1978 THE NAVAL AVIATION SAFETY REVIEW

The AV-8A has displayed a versatility never before experienced in je

Training to fly the HARRIER

An interview with LtCol J.E. "Bud" Iles, CO, VMAT-203

SINCE its introduction into the Marine Corps in 1972, the AV-8A *Harrier* has demonstrated unique capabilities and operational envelopes never before existent in fixed or rotor wing aircraft. Vectored thrust, which enables vertical takeoffs and landings, allows the *Harrier* to be deployed near the combat area for rapid response to close air support needs. Additionally, the AV-8 has operated off amphibious ships and attack carriers, displaying a flexibility and versatility never before experienced in jet aircraft. The potential of vectored thrust in the air-to-air combat maneuvering role is just now being explored.

This capability has not been achieved without cost, however. After a successful beginning that saw only two accidents in the first 2 years of operations, the accident rate has started to climb. Instead of the aircraft operating more safely as experience was gained, the accident rate per 10,000 hours has worsened every year since 1973. While many factors have figured in this trend, the most recognizable and predominant was pilot factor in the V/STOL regime (nozzles down). In fact, of the 28 major accidents through December 1977, 61 percent have had pilot factor coded as at least a partial cause, and more than half of these occurred in the V/STOL area of flight.

Given these statistics, improved pilot training, proficiency, and knowledge of V/STOL flight characteristics have to be considered primary requirements in reducing the AV-8 accident rate. The man assigned this significant training responsibility is LtCol J. E. "Bud" Iles, Commanding Officer of VMAT-203, the Marines' only *Harrier* Training Squadron. LtCol Iles is one of the Marine Corps' most experienced and knowledgeable V/STOL experts. To discuss *Harrier* training and pilot factor accidents, APPROACH writer Richard Shipman interviewed LtCol Iles at VMAT-203, Cherry Point MCAS.

The two-seat TAV-8A has helped *Harrier* pilot training and safety performance.

IS THE *HARRIER* THAT DEMANDING AN AIRCRAFT TO FLY?

To answer that question, you have to have something to compare it to. The first aircraft I flew as a nugget was the F-8 *Crusader,* with night CARQUALS and that sort of thing. I'd say that for first tour aviators, the problems they experience with the *Harrier* are very similar to those we had with the F-8.

Comparing it to present-day aircraft, however, is somewhat different. Since the AV-8A is really the first of a kind, it doesn't have some of the safety margins built into it or the benefit of years of development that other operational Fleet aircraft have. Things like two pilots, two

ircraft. That versatility has not been attained without cost, however.

Improved pilot training and increased proficiency in the V/STOL area of flight is mandatory to improve the *Harrier's* safety record.

engines, advanced AFCS and avionics packages, etc., all build in a safety margin that the *Harrier* doesn't enjoy. I suppose, in this regard, it is more demanding to fly than some other aircraft in our inventory.

THE *HARRIER* HAS RECEIVED CONSIDERABLE PUBLICITY BECAUSE ITS ACCIDENT RATE PER 10,000 HOURS HAS BEEN INCREASING AFTER INTRODUCTION RATHER THAN DECREASING, AS IS THE TREND IN MOST AIRCRAFT. DO YOU CONSIDER THIS TREND MEANINGFUL, AND HOW DO YOU ACCOUNT FOR IT?

Well, I think we have a data base problem. For the *Harrier,* sorties rather than hours are probably more significant since the average AV-8 sortie is only about half as long as a fixed wing jet. Secondly, I think the number of takeoffs and landings is important, since these are statistically high areas of accident potential in a flight profile. A more meaningful concept in the *Harrier* might be to relate accidents to the number of takeoffs and landings. Because we have so many different modes of takeoffs and landings – vertical, short, rolling, conventional – considerably more time is spent in this high risk regime of flight, as the pilots attempt to stay proficient in all of them. I think one could get into considerable argument about the validity of the accident rate per 10,000-hour figure. Now, is the increased accident trend meaningful? I'd say the increase in the *number* of accidents in a given period of time is significant.

WAS PILOT TRAINING A FACTOR IN THE INCREASE IN THE NUMBER OF ACCIDENTS?

I think it was a combination of things, but training was certainly one of them. The initial group of *Harrier* pilots were carefully screened and were experienced, second tour pilots. Since there was no training squadron as such, they trained as a squadron and then deployed as a squadron. There was no loss of continuity in training. There was the necessary close supervisory control. As you are aware, this early experience was very successful – and safe.

Then three things happened. A shift in location from Beaufort to Cherry Point was made due to logistic and organizational demands brought about by increased, worldwide commitments for the *Harrier.* Beaufort was just about an ideal V/STOL training base in terms of runway layout, traffic, and facilities. In addition to this change in base location, the worldwide commitments fragmented the experience base of *Harrier* expertise and presented tremendous logistical impact. When a formal *Harrier* training squadron was formed, much of the *Harrier* expertise that should have been in this squadron was dispersed. Also, the continuity of training was often lost as the student finished training and was delayed before starting to fly in a gun squadron.

Finally, the background requirements for *Harrier* conversion changed, and we started getting the nugget fresh out of the training command. This caused problems because the *Harrier* training syllabus was still geared for the high

quality, experienced, second tour pilot. The nuggets coming in were not comparable in background, yet the syllabus was not changed at that time to reflect their lesser experience.

WHAT HAS BEEN DONE OR WHAT IS BEING DONE TO CORRECT THESE PROBLEMS?

Quite a few things. We were helped out a lot by getting the two-seat *Harrier,* and the concept now is the conversion pilot sees just about everything he might encounter related to V/STOL in the TAV-8 before he goes into the single-seat. In keeping with this philosophy, we've lengthened the syllabus and concentrated on the familiarization stage – the maneuvers unique to V/STOL.

We've also seen an upward trend in the quality of the nugget input we've been getting. Even so, we've added a consolidation period in the TA-4. This is used both to get the pilots a little more flight time before they start *Harrier* conversion and also to give us an opportunity to analyze their performance. We have squadron pilots who fly the TA-4 with them and give us feedback on how they fly. This is one of our biggest inputs.

YOU MENTIONED THE MOVE TO CHERRY POINT AS A FACTOR. HAVE YOU WORKED OUT THE PROBLEMS IN THIS AREA?

The biggest problem at Cherry Point exists during the fam phase where intensive work is done in vertical takeoffs and landings. Therefore, we have been deploying to Beaufort to conduct the fam stage of the syllabus. The facility there lends itself much better to V/STOL work since there are fewer traffic conflicts, a good V/STOL area right at the intersection of the runways, a good concrete runway surface, and a long runway for conventional operations, if needed. We plan to continue this policy.

WHAT OTHER ACTION HAS TAKEN PLACE IN THE *HARRIER* TRAINING SYLLABUS TO IMPROVE PILOT TRAINING?

We've introduced the transition area – the transition between vertical thrustborne flight and forward wingborne flight – into the syllabus. The transition has been identified as a problem area in the Royal Air Force, so we've devoted a portion of our training specifically to it. The transition is demonstrated by the instructor, the various parameters and recovery techniques are explored, and then the students practice. We actually have the students practice putting themselves into a situation where they have to initiate a recovery. It's similar to teaching stalls in fixed wing aircraft as part of the basic training. We have to teach stalls as well, of course.

Another thing we have introduced into our syllabus is VIFFing departures – vectoring in forward flight. This unique aspect of *Harrier* capability is still being explored, and we've added an introductory flight into the program.

We've also made a concerted effort in the area of quality control of the students. As I mentioned earlier, the students we're getting now are carefully screened, and then they go through further screening in the consolidation period. Once they start training, the screening continues. We monitor their progress very closely. We have a graphic portrayal of their grade averages on each hop in the syllabus. This gives us a visual picture of a student's abilities and problems. We particularly look for deviations below past performance that may signal declining performance.

To maintain this student quality control requires very close supervision. Thorough briefs and debriefs, careful grading by the instructors, and accurate completion of grade sheets are all part of this close supervision. This is why we have to keep close tabs on our input to make sure we don't receive more students than we can safely handle.

HOW ARE FLIGHT INSTRUCTORS FOR THE *HARRIER* SELECTED?

The flight instructors are really critical in the *Harrier* program. We have to start the students from scratch here as far as V/STOL flight is concerned. Plus, we've got an entirely new concept of flight with aerodynamic principles that have never been taught to the student before. Therefore, the instructors, particularly the fam instructors, have a significant and vital role in the safe flying of the *Harriers.* By the way, the fam stage is the *last* one an instructor qualifies in, unlike most training squadrons. It's the most demanding stage and the one that requires the most experience.

As far as selection, I find out who is coming available for duty and is interested in becoming an instructor from personal inquiries and feedback from the Group. I talk with the prospective pilots and do some informal liaison with their former squadron COs and squadronmates to see what kind of potential they have. The community is small enough right now that everyone's reputation is fairly well known, so we have been able to maintain an extremely high-quality instructor.

FOR SECOND TOUR PILOTS TRANSITIONING TO THE AV-8, WHAT TYPE OF PILOT BACKGROUND MAKES THE BEST TRANSITION PILOT?

My experience has been that pilot background is not as much a factor as a pilot's perception and learning ability. His air sense, awareness, learning curve, and perceptive ability are the important factors. I don't think you can categorize by background.

Continued

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HAS THE MARINE CORPS BEEN MOVING BACK TO THE PHILOSOPHY OF ASSIGNING SECOND TOUR PILOTS OF HIGHER EXPERIENCE TO *HARRIER* CONVERSION?

Not really. Our largest source of new pilots has been nuggets from the jet pipeline right out of the training command. This is in line with the standard squadron rank structure. As I've said before, we are now getting the topnotch nuggets. This, in conjunction with the consolidation period, has resulted in an excellent group of conversion candidates.

COLONEL, I'D LIKE TO DISCUSS SOME OTHER AREAS THAT HAVE BEEN IDENTIFIED AS PROBLEMS IN THE *HARRIER* PROGRAM AND GET YOUR COMMENTS ON HOW THEY IMPACT ON *HARRIER* TRAINING. THE NATOPS MANUAL, FOR EXAMPLE, WAS CONSIDERED SOMEWHAT INADEQUATE AT FIRST. IS IT UP TO SPEED NOW AS A WORTHWHILE TRAINING MANUAL?

There have been some problems in the past with the manual. When we bought the airplane, we had to take the existing British pubs and base our NATOPS Manual on them. The Brits have a different system than we do. Their equivalent of the NATOPS Manual is broken down into three parts: procedures, operations data, and weapons systems. Our conversion resulted in a lot of simplification, and much of the operational data went into the Tactical Manual. Since our Tac Manual is classified, this data was probably not as available to our pilots as it was to theirs. I think I personally fell into the trap of desiring the simplification since it was a complex manual. But with hindsight, I like the Brits' approach, and we have gone back to their basic philosophy. Much of the operational data has now been made available to our pilots in unclassified form.

THE MARINE CAREER PHILOSOPHY SEEMS TO REQUIRE THAT PILOTS AND MAINTENANCE PERSONNEL MOVE FROM COMMUNITY TO COMMUNITY RATHER THAN SPECIALIZE. DOES THIS LACK OF CONTINUITY IN *HARRIER* PERSONNEL CAUSE PROBLEMS FOR YOU?

This is a very big problem. Because of the trend toward safer aircraft, I think, overall, we have been able to get away from having to maintain a really high level of qualification, proficiency, and training. I don't think you can get away with this in the *Harrier,* though. You really have to know the aircraft technically. The margins for error and tolerance we work with in the AV-8 are much finer than in conventional aircraft, so we really need experienced, qualified people in the program. The instructor pilots in my squadron are not a problem in this regard because they are about the most current and qualified available in the Marine Corps. I think, also, there

is a trend to recycle *Harrier* pilot expertise into the gun squadrons. I don't know if this is true in the enlisted rates, however, and it's every bit as important to have that experience in the maintenance department.

HOW DOES THE CURRENT MANNING LEVEL SHORTFALL IMPACT ON YOUR ABILITY TO SAFELY TRAIN PILOTS?

This in itself shouldn't be a problem if the operational requirement is reduced proportionately. If parts are not available to fly the programmed rate, or people aren't assigned right up to the authorized level, we can accomplish our mission safely – but we have to reduce the output. And this is what we have done. Our system, though, is geared to flight hours, and the tendency is to try to maintain a flight hour rate even when we have reduced capabilities. This results in a pressurized situation – a system overload. Aircraft material condition deteriorates, and we lose the close supervision necessary to ensure proper and safe training. That's probably my most important job – to recognize when we are getting into this type of situation and then put the brakes on.

COLONEL, YOU ARE ONE OF THE MOST QUALIFIED AV-8 PILOTS IN THE UNITED STATES. IS IT SAFE TO SAY, THOUGH, THAT IT'S THE EXCEPTION RATHER THAN THE RULE TO HAVE A COMMANDING OFFICER IN A *HARRIER* SQUADRON WHO HAS A LOT OF TIME IN MODEL? HAVEN'T SOME SKIPPERS BEEN ASSIGNED THAT HAVE NEVER FLOWN THE AIRCRAFT?

This is true, at least in the past. I personally like the Navy system of the prospective commanding officer coming

A lengthened fam syllabus and an increased number of flights in the TAV-8 should reduce the high percentage of accidents occurring in the V/STOL regime.

The many different takeoff and landing modes of the *Harrier* require continual practice to ensure proficiency.

in as executive officer and then fleeting up to CO. This gives them time to become proficient in the aircraft while they are breaking into the job. I feel that proficiency in the aircraft – by all the key supervisors – goes a long way in curbing overaggressiveness and is critical to the general supervision of flying.

HOW DO YOU EXPLAIN THE RELATIVE SUCCESS OF THE ROYAL AIR FORCE IN THEIR *HARRIER* TRAINING PROGRAM? ALTHOUGH THEY HAVE LOST SOME AIRCRAFT, THEIR ACCIDENTS HAVE BEEN FEWER THAN THE MARINES AND HAVE BEEN ASSOCIATED MORE WITH NORMAL JET OPERATIONS THAN WITH THE V/STOL REGIME. THE MARINE CORPS, ON THE OTHER HAND, HAS HAD A LARGE PERCENTAGE OF ITS ACCIDENTS RELATED TO THE NOZZLES-DOWN ENVIRONMENT.

I'd say it's their whole system. For starters, their junior pilots are pilots first, while in the Marine Corps, our junior officers usually have a myriad of other administrative duties that take time away from flying. Pilots learning to fly the *Harrier* need to concentrate on their flying to develop the basic airmanship and skills necessary to fly the airplane. The RAF gives their pilots that time, while in many cases, our pilots are traditionally involved in departmental duties

that require considerable time.

Secondly, the RAF has an excellent training environment. They have dedicated V/STOL airfields. By that I mean everything is *Harrier* oriented – almost no conventional fixed wing operations. Pilots, air traffic controllers, base facilities, logistic support, etc. are all oriented toward the support of the *Harrier* and V/STOL operations.

Also, the pilots coming right out of the RAF training command get an extensive syllabus in a conventional fixed wing aircraft – the *Hunter* – before they begin conversion to the *Harrier*. Therefore, they come into the program with more flight time and experience than our nuggets.

ISN'T THE BRITISH PROGRAM SIMILAR TO THE ONE YOU WERE DESCRIBING THAT HAS BEEN ESTABLISHED HERE?

It is, but it's better. They have an established, integrated syllabus designed with *Harrier* operations in mind. The pilots actually practice maneuvers and tactics in the *Hunter* that will carry over to their *Harrier* training – such as low-level navigation and that sort of thing. Then, when they finish this syllabus, they have about 6 months for conversion training, while we have the students onboard for only about half that time. Thus, they have a much more integrated system approach to work up their pilots to mission qualification.

HAS THERE BEEN ANY MOVE WITHIN THE MARINE CORPS TO EXPAND EITHER THE CONVERSION SYLLABUS OR THE TRANSITION PERIOD?

Here we are getting into equipment, logistic, and financial problems. The Marine Corps just doesn't have the assets to do everything we might like to do. We have expanded the training syllabus from what it used to be, but I don't see much more expansion. The gun squadrons have to complete the full mission qualification of the pilots.

HOW ARE PILOTS HANDLED WHO DO NOT COMPLETE TRAINING?

It depends on where he stops training and why. During the first 13 flights of the syllabus, which are all dual, V/STOL fam flights, if the pilot proves unable to adapt to this regime, he is reassigned elsewhere with no board or stigma attached. Some pilots can perform excellently in other capacities but just not adapt to the *Harrier*. In most of those cases, I'll make an effort to get him another good flying seat.

After the pilot completes the dual syllabus, however, the disposition varies. If the situation causing attrition is something like a violation of flight discipline, he will probably get a Field Flight Disposition Board just like any other pilot. Other situations are handled on a case-by-case basis. But during the first 13 hops, if it's just a failure to adapt to V/STOL flight, the pilot is simply reassigned. We also encourage anybody who isn't truly motivated to step forward at the beginning of training and say so. He'll be transferred to another seat with no questions asked. We've got to have highly motivated and dedicated pilots to fly this aircraft. Up to now, this has been the case 100 percent. No one has asked out yet, and I don't think it's because of any military pressure to stay in the program.

IS THE FUTURE OF MARINE CORPS CLOSE AIR SUPPORT WITH THE V/STOL CONCEPT AND *HARRIER* AIRCRAFT?

I think it's with vectored thrust. It may not be this aircraft, or the next generation of V/STOL aircraft, but vectored thrust is the important concept. It provides a whole new dimension not only in takeoffs and landings but in inflight maneuvering. It gives a tremendous capability that conventional aircraft just don't have.

IN CONCLUSION, COULD YOU GIVE US SOME COMMENTS ABOUT YOUR PHILOSOPHY REGARDING TRAINING *HARRIER* PILOTS AND HOW YOU VIEW THE FUTURE OF *HARRIER* TRAINING?

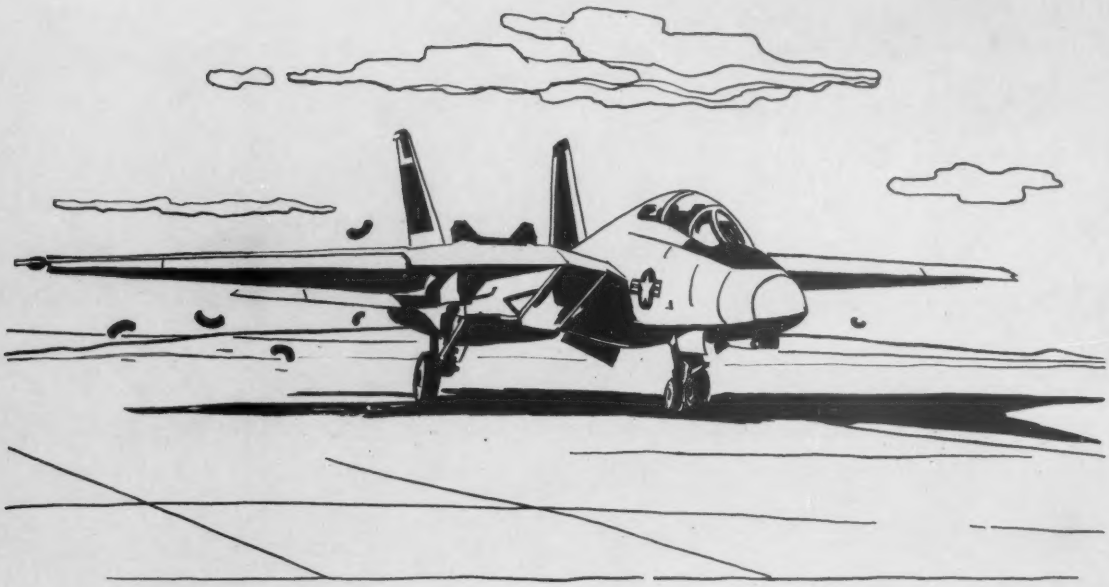
As I've mentioned before, supervision – close supervision – and basic leadership qualities are absolutely critical in this program. All the key supervisors have to constantly monitor the students, and to do this, we have to keep the input down to a level where we can effectively manage the assets we've got. More demands placed on the training squadron pressurize the situation and take away a margin of safety that we are trying to build into the training.

We've posted in the readyroom the key principles of V/STOL flight that I try to ensure every pilot understands. Everyone involved in *Harriers* has to realize that there is a tradeoff between performance and handling qualities, and this aircraft does not have all the safety backups and margin for error that have been developed in conventional aircraft over the years. V/STOL aircraft, with their relatively simple stabilization and control systems, require a very studious, conscientious approach to the matrix of details necessary to fly safely. We just can't get by with the same standards of currency, proficiency, and knowledge that exist in other modern fixed wing aircraft.

I think the Marine Corps should get a lot of credit for pioneering the V/STOL era in U.S. military flight. We've had to take some lumps because, as I've said, we are paving new ground with the vectored thrust concept. The entire system – Test and Evaluation, NAVAIR, Supply, pilots, maintenance – have all had to learn as we go, and it seems like we are always learning new things. As this experience builds, and as the whole system becomes more accustomed to the *Harrier* and its unique requirements, I feel confident we will reduce pilot factor accidents and build a solid base of knowledge and learning for follow-on vectored thrust aircraft. ◄

Bravo Zulu

LCDR Johnson and LT Bueker
VF-142



LCDR Jay Johnson and his RIO, LT Chuck Bueker, were flying a section low-level navigation hop over foreign soil when their F-14 *Tomcat* (Dakota 207) suffered a combined system hydraulic failure. The flight commenced an immediate climb for return to USS AMERICA. The crew reviewed the appropriate emergency procedures and asked their wingman, Dakota 206, to inspect their aircraft for evidence of hydraulic leakage. As the wing airplane joined, LCDR Johnson saw a left engine firewarning light. When the preliminary emergency procedures had been executed and the fire light remained illuminated, the left engine was secured in accordance with NATOPS.

By this time the wingman had examined Dakota 207 and reported no external indications of either fire or hydraulic leakage. LCDR Johnson and LT Bueker then elected to continue their single-engine flight back to the parent CV, 120 miles away. Almost immediately thereafter, the crew experienced a runaway throttle on the starboard engine, accompanied by pinballing caution lights and popping circuit breakers. Reacting calmly but swiftly, LCDR Johnson regained control of his starboard engine by selecting manual throttle. He then turned to the nearest divert field (a NAF 50 miles away). LT Bueker informed Dakota 206 of the latest difficulty and their intended action. Dakota 206 contacted the E-2 airborne controller, who alerted the divert NAF. While LCDR Johnson completed the procedures for the compound emergency, including emergency landing gear and arresting hook extension, LT Bueker contacted the divert field tower. He then confirmed the runway in use, the availability of arresting gear, and obtained landing clearance.

Following a successful midfield arrestment, fire was observed in the port engine bay area. The crew exited the aircraft and assisted local firefighters, who were unfamiliar with the *Tomcat*, in extinguishing the blaze.

By their professional handling of multiple emergencies and their timely decision to divert, LCDR Johnson and LT Bueker turned a potentially disastrous situation into a safe recovery. Their sound judgment and solid airmanship were apparent. Well done! ◄

Refueling Contamination. A squadron of H-53s was engaged in an external lift project necessitating many lifts. The morning the mission began, the CH-53s were fueled from the TAFDS (tactical aircraft fuel dispensing system) at Homeplate. They took off at intervals, and the pilots flew to their destination, less than 100 miles away.

Upon completion of that leg, the aircraft refueled from transportable HERS (helicopter expeditionary refueling system) pods, which previously had been airlifted to the site. One crew picked up a 105 mm howitzer externally for the trip back.

Thirty minutes after departure, the fuel filter bypass light illuminated on the advisory panel. The pilot elected to abort and landed at a training support facility. The crew sampled the fuel in the aircraft and found the sponsons filled mostly with muddy water.

After this puckering discovery, the word was flashed to all other aircraft involved in the lift. All refueling from the HERS pods was suspended. About the same time this was occurring at the divert site, another H-53 landed back at Homeplate, having finished its round trip. Again the fuel filter bypass advisory light came on, and again sampling disclosed mostly water in the sponsons. This aircraft also had refueled from the HERS pods.

Despite intensive investigation, nothing was ever reported as to how or why the HERS pods became contaminated. Other aircraft had refueled from the pods with nary any difficulties. The pods had been filled initially from normal refueling points before being airlifted to the mission site. All normal procedures had been followed regarding sampling and filtering, with no abnormalities noted.

The fuel filter bypass light illuminates anytime there's a pressure drop of 1.37 psi across the filter. Actual bypass doesn't occur until the pressure drop exceeds 3.44 psi. Thus, the fuel filter bypass advisory light signals impending bypass. The H-53 NATOPS manual was changed to call for landing as soon as possible (at the first available safe landing site) after the light comes on.

However, in the light of what transpired that day (plus a history of dual-engine flameouts caused by fuel contamination), a recommendation to change the single advisory light to two caution lights is being evaluated by the type commanders.

Dual Flameout. The crew of an H-46 were sitting on the helo pad of a hospital when the No. 1 engine flamed out. Within seconds, the No. 2 engine also flamed out. An investigation confirmed what had been suspected. The flameouts were caused by water-contaminated fuel. It was discovered that the contaminated fuel came from the aircraft ERT (extended range tank).

The sequence of events leading to the flameouts were:

- The aircraft was one of many which had returned recently from a deployment.
- Those aircraft with ERTs installed were stripped, and the ERTs were turned into a consolidated pool.
- Squadron line personnel were directed to prepare the tanks for transfer. The tanks were purged with water to remove combustible fumes and contaminants.
- A procedures breakdown followed the purging, and the tanks were never drained nor inspected.
- The tanks were reported RFI, even though they still had water in them.

• When a MedEvac flight necessitated installation, the tanks were installed.

• The flightcrew pulled their preflight and checked fuel samples from the stub wing fuel tanks, but because the ERTs were RFI and required fuel, they were not drain checked.

The crew took off and made two stops, one of which included refueling, before landing at the pad where the flameouts occurred.

While cruising at altitude, the pilot selected fuel from the ERTs, but the nosedown attitude moved the water to the forward portion of the tank. As a result, the water was not introduced into the engines. Also, the pilot secured the fuel transfer and used the stub wing fuel for his first two landings.

On the last leg, the pilot selected fuel from the ERTs but did not secure fuel transfer during his landing at the hospital pad. The aircraft's nose-high attitude on deck permitted the water to enter the engines, and the flameouts occurred.

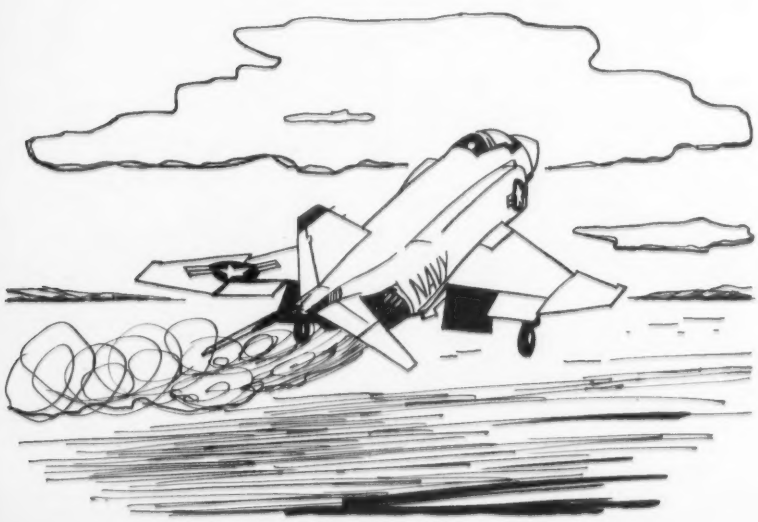
The squadron recommended that: after purging/cleaning ERTs, the door assembly be removed and the ERT be visually checked to ensure that all contaminants have been removed; all empty ERTs installed in aircraft be treated as full tanks and checked for contaminants through the drain system; maintenance actions be assigned a VIDS/MAF with a followup QA inspection; a change to the CH-46 NATOPS manual requiring that for all takeoffs and landings the fuel transfer for the ERTs be secured; and a change to NAVAIR 01-250HDA-6-3, card 5.3, step 4, to read "Fuel cells and ERT (when installed) [be checked] for contamination and evidence of water."

ACLS Excitement. An F-4J almost went out of control when it experienced a severe nose pitchup after the pilot engaged the coupler for a Mode I Automatic Carrier Landing Systems approach. Only prompt corrective action by the pilot prevented the aircraft from stalling and departing. Postflight investigation revealed that no malfunctions existed in either the aircraft or the ground ACLS equipment. What was discovered was a very dangerous procedural error by the ACLS controller that can get the unwary F-4 pilot in deep and serious trouble.

The flight was a normal training hop, and the crew had flown two successful Mode II approaches, checking out the ACLS, the automatic flight control system, and the approach power compensator system. With everything looking good, the third approach was to be a fully coupled Mode I ACLS. After normal ACLS lock-on at 6.5 miles, the controller transmitted, "114 report coupled." However, before the pilot engaged the coupler, the controller transmitted commands. When the pilot did engage the coupler, the control stick snapped full aft, the *Phantom* pitched noseup, reaching approximately 40-50 degrees nose high. The angle-of-attack shot up to 28 units and stabilized at 30 units as the aircraft entered wing rock. Simultaneously, the pilot disengaged ACLS and APCS, applied full forward stick, and selected afterburners. The port wing fell off about 30 degrees, and the aircraft successfully recovered.

The student controller under instruction engaged the command mode of ACLS prior to the pilot reporting coupled. In the F-4 aircraft, if the pilot then engages the coupler, the aircraft will receive a large magnitude command which has been allowed to build prior to coupling. This is what happened.

The dangers of this situation are obvious. All F-4 aircrews and ACLS controllers should be acutely aware of this system "glitch," and the investigative board recommended that a modification be engineered to preclude further incidents of this nature. Fortunately, this mishap occurred to an experienced pilot, or the outcome might have been completely different. The pilot's prompt, positive, and professional recovery from a potentially dangerous low-altitude situation averted an accident. Nice job, CDR Bud Lineberger! ◄



It could have been a disaster!

10 THE horror of two large transport planes colliding with each other on the ground was vividly displayed by the crash of two 747s in the Canary Islands some months ago. While the problem in the Canaries crash – the need to use the active runway as a taxiway – is not very common in naval flight operations, a similar hazard nevertheless exists at fields that permit operations on several runways simultaneously. A recent incident points up how dangerous this situation can be.

The Navy transport landed on the east-west runway and was cleared off the runway at the 2000-feet-remaining point. The pilot in command elected not to try for this turnoff and was then cleared off at the 1000-foot-remaining point and told to contact ground on the UHF frequency.

The transport cleared the duty runway and attempted, unsuccessfully, to contact ground on the published VHF frequency. After several attempts, the crew came up ground control on the UHF frequency, but in the process, they had crossed the north-south runway *without contacting ground or tower.*

At most naval air stations, this would have posed no immediate danger since there is usually only one active runway. However, this air station was using both runways, and a large Air Force transport had been cleared for takeoff on the intersecting runway!

Fortunately, the visibility was good. The Air Force plane commander was able to see the Navy transport coming and did not commence his takeoff roll. However, it doesn't take much imagination to see the potential for disaster if the visibility has been reduced or had the plane commander of the Air Force transport buried his head in the cockpit prior to his takeoff roll.

The pilot of the Navy transport should, of course, have requested and received clearance prior to crossing the runway. The tower controllers, however, could have done their share to prevent this incident by contacting the Navy plane on Guard (they were monitoring) or by reminding the crew to call prior to crossing the north-south before they switched them to ground control frequency.

Even if clearance is received to cross an active or off-duty runway, the prudent pilots check closely for conflicting traffic. Crashes on the ground can be just as deadly as midairs. ◄

GLOSSARY

IN response to requests made in our reader's survey, the following is a list of some of the acronyms used by APPROACH, and their meaning. Another list of acronyms was published in the MAR '77 issue of APPROACH.

ADF – Automatic Direction Finding. A navigational aid system.

AFB – Air Force Base.

AFC – Air Frames Change.

AFCS – Automatic Flight Control System.

AOA – Angle-of-Attack. Refers to the relationship between the aircraft's attitude and the relative wind. It is read out on a gage in the cockpit, and on light indexers when the gear are down.

ASAP – As Soon As Possible.

ASR – Approach Surveillance Radar. A type of instrument approach where lineup but not glide slope information is given.

ASW – Anti-submarine Warfare.

ATC – Air Traffic Control.

AVGAS – Aviation Gasoline. Used in non-jet aircraft.

Bravo Zulu – Well Done.

CARQUALs – Carrier Qualifications.

CDI – Collateral Duty Inspector. An experienced mechanic who is certified to inspect work done by others to ensure its accuracy.

CRT – Combat-Rated Thrust. Refers to afterburner operation of a jet engine.

CV – Aircraft Carrier.

DIR – Disassembly Inspection Report. An engineering analysis of aircraft parts suspected of failing or malfunctioning.

FE – Flight Engineer.

FRAMP – Fleet Replacement Aviation Maintenance Personnel Training Programs. Course of instructions given to maintenance personnel in Fleet type aircraft prior to reporting to their Fleet squadron.

JO – Junior Officer.

LOX – Liquid Oxygen. Used for breathing at high altitudes.

LPA – The life preserver assembly worn by aviation personnel in most aircraft.

MDA – Minimum Descent Altitude. A published minimum altitude for a nonprecision approach.

MRT – Military-Rated Thrust. Full power operation of a jet engine, less afterburner. Also called MILITARY power.

NARF – Naval Air Rework Facility. Where aircraft are overhauled.

NOTAM – Notice to Airmen. A regularly updated status summary of airfield items that affect aircraft operations.

PPR – Prior Permission Required. Usually used in reference to landing rights at cross-country bases.

PSI – Pounds Per Square Inch.

RTB – Return to Base.

SERE – Survival, Escape, Resistance, and Evasion.

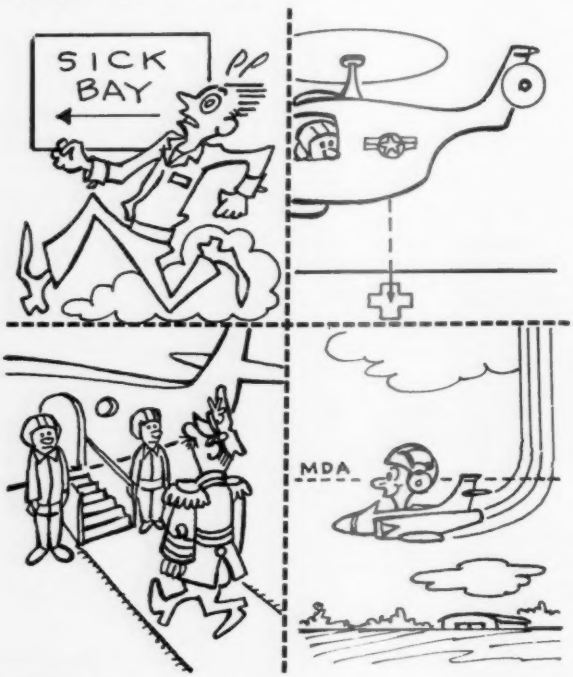
SITREP – Situation Report.

TCA – Terminal Control Area. Air Traffic Control designation for certain high-density U.S. air traffic areas.

OK, everybody...let's take the **INSTRUMENT FLYING QUIZ!**

SO you think you know all there is to know about the instrument flying business. If so, the following little exercise should be strictly no sweat. Well, let's see! Admittedly, some of the questions are less important than others, but they are all legitimate instrument flying questions. Score 1 for each correct answer, and grade yourself according to the scale at the end of the article.

VDP is . . .



1. VDP is:

a. Cause for making it to sickbay doubletime.

b. Vertical Drop Point: used by helo pilots in VERTREP operations.

c. Very Distinguished Person: requires special code in DD-175 when carrying as passengers.

d. Visual Descent Point: an electronic definition of the point where a 3-degree glide slope intersects the minimum descent altitude and therefore the point at which a normal safe descent to the runway can be started.

2. You are being vectored for a precision final when you hear the aircraft in front of you request clearance for a "sidestep maneuver." Clue: it's not a maneuver used by *Harriers,* nor is it a midair collision avoidance technique. So, what is it?

3. Having been thoroughly baffled by the sidestep maneuver, you next hear the aircraft ahead of you "cleared for the option." Not wanting to admit you slept through the last instrument ground school, you also request and receive clearance for an option approach. What options are now available to you?

4. Proceeding toward Columbus AFB in your TACAN-only F-4J, you are cleared for the HI-VOR/DME 31C approach, defined off a TACAN channel. Can you shoot this approach?

5. The pre-approach intercept maneuver refers to:

a. The 90-degree angle-of-bank/3G turn you employ to make good your point-to-point on your instrument check.

b. Lighting the burners and unloading the aircraft to make your EAC at the ship.

c. An air-to-air intercept practice evolution on an aircraft about to commence his instrument approach.

d. The turn at the initial approach fix in the shortest direction to intercept the initial approach course which permits you to begin your descent when heading inbound.

6. *Everybody* knows that if you don't break out at the MDA on a circling approach, you execute a missed approach. What do you do, though, if you go IMC *during* the circling maneuver *after* you break out at MDA?

7. If you happen into a general aviation field or air carrier airport on a cross-country to wow the homefolks, you may

encounter a tri-color VASI. The colors that correspond to low-, high-, and on-glide slope are:

8. What does the "A" signify in the approach description HI-VOR/DME or TACAN A (Glenview NAS)?

Been doing pretty well so far? OK, now we're going to separate the real trivia experts from the mere amateurs.

9. What is SWAP?

a. The air arm of a specially trained team of law enforcement agents.

b. A technique employed in BUPERS to change good orders to bad at the last minute.

c. Special Weapons Action Plan: An emergency procedure that goes into effect in the event of an aircraft incident related to nuclear weapons.

d. Severe Weather Avoidance Plan: A plan to reroute traffic to avoid severe weather in the New York ARTTC area to provide the least disruption to the ATC system when large portions of airspace are unusable due to severe weather.

10. This one is the tiebreaker. Open an H-1/H-2 Enroute High Altitude chart and locate Austin, Texas. The route out of Acton to Humble reads 090, with a small circle figure after it. What does this mean? Notice that it doesn't appear on all the courses on the chart.

Give up on that one, huh? OK, here are the answers:

1. (d) This is a relatively new concept that, hopefully, will minimize landing-short accidents caused by premature descents to the runway from the MDA.

2. The "sidestep maneuver" is a visual maneuver accomplished by a pilot at the completion of an instrument approach to permit a straight-in landing on a parallel runway not more than 1200 feet to either side of the runway to which the instrument approach was conducted.

3. Options available to you are full-stop landing, touch-and-go, low approach, or missed approach. It's great for keeping students on their toes.

4. In preparing you for your next instrument exam, we made this a trick question. You can (are physically able to) shoot the approach, but you may not (do not have permission/are not legal to) shoot the approach. TACAN-only aircraft may shoot only those instrument approaches where there is some notation of TACAN in the procedural name: e.g., HI-VORTAC, VOR Runway 36 (TAC), HI-VOR or TACAN.

5. (d)

6. You make an initial climbing turn toward the runway and continue the turn until intercepting the published missed approach for the approach you just shot.

7. Low is red; high is amber; and on-glide slope is green. (Note how it doesn't correspond with angle-of-attack indexers.)

8. The "A" signifies that there is no straight-in available for that approach, only circling.

9. (d)

10. Couldn't find the answer to that one, could you? Well, it's a degree symbol that is used on those courses that could be misread if the chart were read upside down.

SWAP is . . .

Well, there it is. Admittedly, your life and death may not hinge on whether you knew all the answers or not, but the professional pilot knows as much about his profession as is possible. And who knows, maybe someday you'll even have use for this trivia! Grade yourself on the following scale:

Number correct:

9/10: A great trivia player – you probably know the name of Cisco Kid's horse! You also probably know a lot about instrument flying.

7/8: Not bad – but remember, what's trivia today might be paramount tomorrow! Keep studying.

6 and below: Probably rationalize this poor showing by saying trivia is trivia. Probably also don't know as much about instrument flying as you should. ◄

Bring thinking back into flying

By LCDR Mike Schuster
MATWING ONE Safety Officer

Situation: Aircrew suspects a bleed air problem and possible fire. They commence a precautionary approach with high gross weight and high drag count to a field with an elevation 4000 feet higher than homebase. During the approach they are told they are trailing light grey smoke.
Reaction: Shut the engine down.
Result: Unable to arrest sink rate, landed short – ALPHA damage.
Situation: Aircrew gets a firewarning light after the 180-degree position.
Reaction: Shut the engine down. The approach is continued at high gross weight and high drag count.
Result: Unable to arrest sink rate, ALPHA damage and one fatal injury.

What do these mishaps have in common as the cause? Primarily, the flightcrews failed to integrate their emergency procedures with their flight environment. Since we first sprouted wings, we have been learning (and teaching) the stimulus response theory of emergency management. The reenforcement of so many readyroom lectures and the competition for good NATOPS exam grades have indelibly etched the NATOPS checklist responses into our minds. That checklist response is preordained to be the primary – or perhaps the only – response considered by an aircrew acting under stress. The truth is, there are certain sets of conditions that could make the NATOPS response the *wrong* response. Heresy? Not quite!

The NATOPS program has taken naval aviation a long way toward safe aircraft operations, and it remains our primary aircrew training tool. However, if the rote NATOPS procedure will cause an aircraft loss, as in the two previously cited instances, and there is the possibility of saving the aircraft by modifying NATOPS procedures, then the logical course of action is clear. To put it into the terms of "The Rational Man Theory," as proposed by contemporary A-6 scholar and philosopher LCDR J. R. "Spot" MacDonald: "If a situation requires a response, but no directives define or authorize a suitable course of action, then it is appropriate to pursue the line of reasoning that a 'rational man' would develop to suit the situation." Further, to quote the NATOPS manual: "This manual contains information on all aircraft systems, performance data, and operating procedures required for safe and effective operations. However, it is not a substitute for sound judgment. Compound emergencies, available facilities, adverse weather or terrain, or considerations affecting the lives and property of others may require modification of the procedures contained herein."

Several unnecessary mishaps, including these two major aircraft accidents, precipitated MATWING ONE to conduct a search for a method of training flightcrews to better respond to emergency situations. This search culminated in the development of a scenario training approach to NATOPS procedures. The backbone of this system is rational analysis of how NATOPS procedures will interface with real-world flight regimes. For instance, will aircraft configuration allow flight to continue if one engine is shut down? Should you go straight to a divert rather than blowing your gear down at a bad weather destination?

To answer these and similar questions correctly during an airborne emergency, the flightcrew has to consider many factors such as: aircraft gross weight, density altitude, drag counts, weather, winds, runway condition, aircraft performance, etc. The considerations are voluminous and will vary between aircraft types. The message, however, is to take the NATOPS training out of the readyroom environment and put it in the context in which it will be

used. Evaluate airborne influences and explore those areas where good judgment must prevail. Steer the flightcrews away from rote checklist responses, and force them to include different combinations of variables in their calculations.

NATOPS exams must also reflect this scenario philosophy. The aircrews must be responsive at both the training and testing levels if their decisions in an airborne emergency are to include environmental influences and performance parameters.

The incorporation of scenarios into the training syllabus for flight simulators will encourage the assimilation of the thought process and allow its gradual transfer from the academic environment to the practical inflight environment. Many NATOPS scenarios can be developed for use by flight simulator instructors to improve and test flightcrews' abilities to cope with emergencies under various conditions. The inclusion of this scenario information into a VTS (Versatile Training System) computer allows even greater flexibility in training. The computer can be programmed to follow myriad logic paths, and allow scenario development keyed to different sequential responses. Through the use of remote terminals, aircrews can follow a self-test program which will allow use of a wide range of scenarios on a flexible time schedule. The VTS capability appears to be particularly valuable in the training and RAG environments, but the applications are just as valuable to Fleet units.

As a result of this broader spectrum training approach, aircrews will have an enhanced capability to respond to real-world emergency situations. The potential for saving lives and scarce aircraft certainly mark this as a training system that should be considered seriously for inclusion in aircrew training at every level. ◄

An inflight emergency, an inexperienced pilot, and a lack of coordination on the ground all led to an injured RIO and a destroyed F-4. The entire mishap was characterized by . . .

TOO MUCH TALK . . .

THE accident mishap board's first conclusion was to the point: "The nature of this emergency was not of sufficient magnitude to result in the loss of an aircraft." Yet an F-4 was destroyed. Why?

As in almost all accidents, the proverbial "chain" of events preceding a mishap was present in this accident. Perhaps the most disturbing link, though, was the lack of assistance the young, inexperienced aviator received when he encountered probably the first significant emergency of his aviation career. It wasn't because no one *tried* to help him. Rather, *too many* people attempted to assist, setting up a lack of coordination and communication that made an already bad situation worse. Here is how it happened.

The accident pilot was a nugget aviator with only a little more than 300 total flight hours. As part of his training, he was scheduled for a two-plane instrument practice and air maneuvering flight. The instrument phase of the flight was normal, and the two *Phantoms* were engaged in gunsight tracking maneuvers prior to returning to base. The wingman found himself inverted, slightly nose-high following one maneuver, so he discontinued the exercise and recovered the aircraft. Upon rolling wings level, however, the pilot found he could not retard the throttles below 95 percent.

The young aviator immediately broadcast his plight to the flight leader. The flight leader in turn contacted base radio, requested an LSO on station, and declared an emergency with Homeplate Tower. As the flight proceeded inbound, the crewmembers discussed approach and landing techniques. Together they decided on the following course of action: a spiraling descent shutting down the port engine during the descent; using G forces to slow the aircraft; land on the numbers and secure the other engine; make a longfield arrestment on the 15,000-foot runway.

As the flight was planning its procedures, an LSO was dispatched from the squadron to the duty runway to assist with the landing. Since the squadron base radio was not operating well, the ops officer of the squadron, who was in company with the LSO, suggested that the flight and all concerned come up tower frequency. The ops officer had no way of knowing what confusion this would lead to.

The young pilot commenced his descent in the manner that had been discussed. He extended the boards, secured the port engine, and deployed the ram air turbine. On level-off at 4000 feet, he slowed the aircraft by G forces and extended the gear and flaps. At this point the LSO came up on tower frequency and instructed the pilot to go to full flaps and drop his hook.

The LSO and the ops officer were not aware of the other procedures that had been briefed. In their opinion, a shortfield arrestment, preceded by deploying the drag chute just before touchdown, was the best method of stopping the aircraft. The LSO also briefed the pilot to fly a standard 700-800 foot per minute rate of descent to touchdown.

The F-4 started a straight-in approach from about 15 miles. The pilot tried to control his airspeed by S turning, but he accelerated nevertheless and had trouble descending. One mile from the runway, he was too high and too fast to make a safe landing. The LSO ordered a waveoff.

The *Phantom* had no trouble maintaining safe flying speed during the waveoff. In fact, the pilot tightened his turn downwind to keep his airspeed under control. Unfortunately, this put him close aboard at the 180, which led to a high, tight, and fast pattern with insufficient straightaway on the second approach. Once again the LSO directed a waveoff.

The young aviator commenced his third approach from a wider, lower abeam position, resulting in adequate straightaway and good lineup. On final, however, the F-4's airspeed increased to 200 KIAS. The *Phantom* crossed the runway threshold at about 50 feet, at which time the LSO called to deploy the drag chute. The chute blossomed fully, but the aircraft appeared to level off slightly. This caused it to overfly the shortfield E-28 arresting gear.

When the aircraft floated over the gear, the LSO broadcast, "Take it around! Take it around!" Witnesses observed the right engine go into burner, but the aircraft touched down about 3000 feet down the runway. The F-4 started porpoising, touching down twice more. At this point, an unidentified voice came up on the air and instructed the *extremis* F-4 to "Shut it down! Shut it

and too little help

down!" Finally, halfway down the runway at about 50 feet in the air, the pilot felt that he was too slow to fly and too fast to land. The RIO ejected and the pilot followed shortly thereafter. Both ejections were successful, although the RIO injured his back. The aircraft was destroyed.

What were the events that turned a salvageable inflight emergency into a major aircraft accident? The throttle malfunction was certainly one, although the board could not find a definitive reason for the problem. Pilot inexperience and technique were also definite factors. Even with these two strikes, the situation might have been saved had there been better coordination and communication from those attempting to assist.

The entire evolution was hampered by poor communication procedures. With everyone up tower frequency, extreme congestion resulted. Transmissions were blocked out, extraneous radio calls were made, pertinent information could not be transmitted, and general radio chaos made the emergency that much more difficult. A segment of the tower tapes gives an idea how conditions were.

Phantom 32 [on ground, relaying messages]: Understand 4 minutes. Roger, break, Tower, *Phantom* 22 [emergency aircraft] is spiraling over the field now. He has two runaway engines. He's requesting the arresting gear and an LSO, and declaring an emergency. Estimated arrival, 4 minutes.

Tower: 32 Roger, which runway is he going to take?

Phantom 32: Stand by, Break, *Phantom* 22, which runway are you going to take? 32?

Phantom 22: Roger, Roger.

Tower: Phantom 32, understand Runway 32, wind three three zero degrees at four, altimeter 3006, request does he have any ordnance onboard?

Phantom 32: He didn't say yet what runway he's going to take. I'll try to contact him. Break, Break, *Phantom* 22, what runway are you approaching? [Transmissions from *Phantom* 22 and flight leader *Phantom* 00 unreadable.]

Phantom 32: Okay, are you reading the tower?

Phantom 22: That's affirmative. We do have radio contact

with the tower.

Phantom 32: Tower, are you reading *Phantom* 22?

Phantom 00: All right, shut up a minute, will you? 22, 00 [rest of transmission unreadable).

Tower: Phantom 22, Homeplate Tower.

Phantom 00: Tower, *Phantom* 00, please be quiet until we're ready for you.

Paddles: Tower, Paddles, clearance down Runway 32.

Tower: Paddles, Tower, cleared down Runway 32. Paddles, Tower, cleared down 32.

Tower: Aircraft on taxiway, hold.

Tower: Paddles, Tower, cleared down Runway 32.

Paddles: Roger.

Tower: Aircraft on taxiway, hold, emergency in progress.

Tower: Vehicle four zero, cleared down three two.

Phantom 00: Two two, why don't you leave your hook up depending on your airspeed on touchdown.

Tower: Phantom 00, request the nature of the emergency. What is runaway engines?

Phantom 00: Roger, engines stuck at full MILITARY and can't slow down.

Tower: Roger.

Paddles: Okay, 22, this is Paddles. Have you secured one of your engines yet? [Transmission from 22 unreadable.]

Paddles: Okay, go ahead and drop your hook, get ready for the arresting gear; remember it's about 1500 feet from the end of the runway.

1508A: Tower, this is *Cessna* 1508A.

Tower: Phantom 00, Tower.

Paddles: 22, Paddles, control your speed on touchdown, and if you're below 180 KIAS, go ahead and drop it right there.

Tower: Paddles, Tower. Paddles, Tower. Request landing weight and speed of the F-4.

1508A: Tower, *Cessna* 1508A.

Paddles: Two two, can you give me your estimated weight on touchdown?

And so it went. As a result of the communication problems, the accident pilot changes his original plan; i.e., shortfield arrestment vice longfield and deploying the chute before touchdown rather than after. Also, the LSO never briefed the procedure for *Phantom* 22 if he didn't trap on the shortfield gear. Finally, an unidentified voice ordered the *Phantom* to "shut it down" after the bolter, even though the aircraft was in burner attempting a go-around as directed by the LSO.

The conclusion of the accident boardmembers was that the confusion of the situation and the communication problems resulted in several wrong decisions:

- A long, low, straight-in approach should have been used to maintain an acceptable airspeed for landing. A test aircraft under similar conditions was able to accomplish this fairly easily.
- The drag chute should not have been deployed, as it caused an attitude change at a critical moment in the approach.
- A shortfield arrestment should not have been chosen over a longfield arrestment since the speed of the F-4 on touchdown would have been considerably in excess of the maximum allowable for that arresting gear. Also, there was a very long runway available.
- NATOPS was not followed in that the gear and flaps were not blown down. If both generators go off the line or the engines are secured, as was the plan, the gear are likely to collapse if the EMERGENCY DOWN method is not used.

This accident demonstrates the vital need for clear, concise, and noncontradictory communications during an emergency. It's human nature to want to help a fellow aviator in trouble, but too many people contributing their "two cents' worth" only compound the problem.

One approach to avoid the problems with communication and control that occurred in this mishap might be to establish an "on-scene commander" for inflight emergencies similar to the on-scene commander following crashes. The premishap plan could define who this would be, depending on circumstances: flight leader, CO, safety officer, or duty officer, for example. The important concept is to have as few people as possible talking to the emergency aircraft. Anyone with inputs can relay them to the on-scene commander for his evaluation, but he will be the only one talking with the emergency aircraft.

It's well accepted in aviation that preplanning and anticipation go a long way in preventing inflight emergencies from turning into aircraft accidents. But don't let this concept stop with aircrew preparation and the premishap plan. Does your squadron have set procedures for coordinating inflight emergencies? Does your squadron have a plan with the air station to put an LSO on station at the duty runway in a short time? Does your squadron have a multichannel radio in good working order? Don't let a tragic accident be the impetus for you to start researching these questions. ◄

Relax. Computers will never replace human beings entirely. Someone has to complain about the errors.

Ace L.

The forecast altimeter *is* important!

By Capt P. J. Hagan
MARTD, Jacksonville, FL

NOT very long ago, I found myself sitting in the Griffiss AFB line shack nursing a slight stutter and, hopefully, a not too noticeable hand tremor. Recalling the recently completed flight, I asked myself the obvious question: "What should I have done differently?" Even at this writing I am still uncertain, so I thought the experience would be worth sharing.

It was to be a standard cross-country. I filed a standard DD-175 listing Syracuse as my alternate, and received a standard weather briefing. (Notice anything unusual about the terminal forecast, below?) Everything was normal until I lost my UHF radio over Washington, DC, IMC at FL330.

Complying with lost comm procedures, I stayed at FL330, squawking the appropriate code as I proceeded toward the initial approach fix for my filed destination. At the filed estimated time en route, still IMC, I descended in holding to 11,000 feet, as per the approach plate. I set in the forecast altimeter, 29.94, referring to my weather brief. I also used the forecast winds to determine the duty runway – must be Runway 15.

As I started to intercept the 15-mile arc, my radios came back! Approach Control ordered an immediate left turn for vectors to a precision approach, Runway 33. "Descend and maintain 2000 feet. Griffiss weather: partially obscured, measured 200 feet overcast, 1 mile in rain and fog." (Great!)

"Nine miles from touchdown, slow to approach speed."

Super, the radar altimeter is inop. Better request Syracuse weather.

" . . . approaching glide slope, begin descent . . . "

From this point to decision height was as routine as any GCA to minimums can be. But at the planned decision height of 699 feet MSL, as per the Enroute Supplement, I was still IMC and the controller was calling 2 miles from touchdown!

No wonder they call it decision height. Do I believe my pressure altimeter or the controller who is by now calling me above glide slope and still 2 miles from the runway? I believed the controller, pressed on, broke out, and made a normal landing – except the altimeter read 290 feet on rollout. Significant when the field elevation is 504 feet. I requested and received the local altimeter setting – 30.26 (Arggh). Five minutes later the field went below mins and closed. Syracuse closed 15 minutes hence (Sigh).

Now, what would Grampaw Pettibone say about all this. "Ye Gods, what was this young lad thinking. He disregarded his altimeter and continued the approach. Is he trying to put himself on 'terminal' leave?"

Perhaps, but given identical circumstances, I would do the same again.

One thing I've often wondered; had my radios remained inoperative, would I have thought to recheck the Syracuse terminal forecast and reset the altimeter after the missed approach at Griffiss? If not, would I still be making missed approaches over central New York?

NOTE: Syracuse is only 32 miles from Griffiss. As it turned out, the Griffiss Forecast altimeter was 320 feet off due to a clerical error in the weather brief (Groan).

Some "might haves":

- Knowing that the destination and alternate were close together, I might have questioned the 300-foot difference in the forecast altimeter settings in the weather brief. Had I noticed it, I probably would have raised a question.
- Keeping in mind that I knew I was shooting a GCA down to 200 and 1 and was obviously concentrating on the gages, I nevertheless might have crosschecked my DME at decision height. A DME of 3 to 3½ miles would have reconfirmed my distance to touchdown. Perhaps I did, but I don't consciously remember this being a factor in deciding to continue the approach.

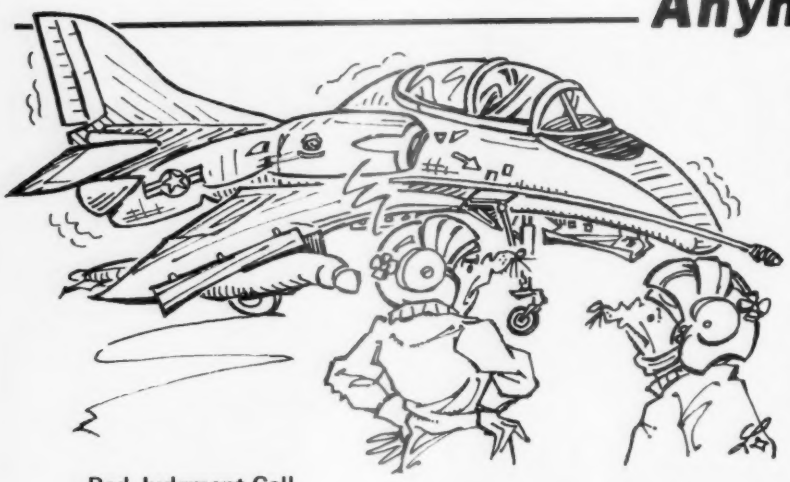
There is no moral to this story other than a few hindsight thoughts:

1. Forecast altimeter settings are important and should be accurate.
2. One means of two-way communications is inadequate. Why can't we outfit all our aircraft with two radios? How many pilots and aircraft have been lost and how many missions aborted due to lost comm?
3. Give *all* aspects of the weather brief more than casual attention.

IV. TERMINAL FORECASTS

DESTINATION	CLOUD LAYERS	VIS/WEA	SFC WIND	ALTIMETER	VALID TIME
RME	14–15Z 5 SCT 15 OVC	3-4 RWF	100/06	29.94 INS	1657 Z TO 1857 Z
ALTERNATE SYR	17–18 35 BKN 70 OVC	7	V/05	30.24 INS	1705 Z TO 1905 Z
INTMED STOP	40% 3 RW			INS	Z TO Z

Anymouse



Bad Judgment Call

PICTURE, if you will, a student going out on his second formation hop, doing a section takeoff for the second time in his life. It's a common scene that's repeated every day in the Naval Air Training Command's Advanced Jet Syllabus. It's a tense scene for the student. It is one, however, that leads to a higher state of proficiency and that will be repeated almost daily as the young student develops into a professional naval aviator. In this picture, also, is the instructor pilot who has so many years of experience behind him that he has been designated the commanding officer of the squadron. A picture of wisdom being passed from generation to generation? Look again!

The lead aircraft in this section takeoff has just had its engine changed, and believe it or not, is on a postmaintenance checkflight. The flight lead was assigned this test aircraft at the direction of the commanding officer who determined that he could "kill two birds with one stone" and get the test hop while completing a syllabus hop.

OPNAV 4790 states: "At the discretion of the commanding officer, checkflights may be flown in combination with operational flights, provided the operational portion is not conducted until the checkflight requirements have been completed." [Note: Local, Wing, etc. instructions may contain additional guidelines governing the conduct of checkflights.]

Not only did this situation not comply with the letter of the law, it does not comply with common sense. After an aircraft has had almost every one of its major systems pulled apart and a new engine put back in, and is flying for the first time after being put back together, is not the time to use the aircraft to lead a student section takeoff.

Is this the commanding officer who gave a determined nod of approval when the wing commander said he would not hesitate to "pull wings" if his pilots used bad judgment and were found violating set standards for safety of flight? Unfortunately, the answer is yes.

I suppose everyone is entitled to a few bad judgment calls now and again. Yet how many times could the phrase "bad judgment call" be substituted for the phrase "pilot error" in so many accident report findings?

Notveryimpressedmouse

Too Close Cat

THE E-2 was spotted on catapult No. 3 at night for launch 10 minutes ahead of the regular go. Pressure to launch the tanker early in a no-bingo situation prompted the launching of the KA-6 spotted on catapult No. 4 first. The outer 1 inch of the wingtip passed through the prop arc of the E-2, but no one noticed the collision. The E-2 was placed in tension almost

The purpose of Anymouse (anonymous) Reports is to help prevent or overcome dangerous situations. They are submitted by Naval and Marine Corps aviation personnel who have had hazardous or unsafe aviation experiences. These reports need not be signed. Self-mailing forms for writing Anymouse Reports are available in readyrooms and line shacks. All reports are considered for appropriate action.

REPORT AN INCIDENT
PREVENT AN ACCIDENT

immediately after the KA-6D launched. Nothing above the normal vibration of the aircraft under full power was noticed until the airframe continued to shake and vibrate after becoming airborne.

An emergency was declared, fuel dumps actuated, and an immediate turn downwind commenced. The KA-6 sustained only superficial damage to the wingtip speed brakes, but the E-2 lost 1 inch off the tips of blades 3 and 4, requiring a prop change. Had the Aero Products steel prop been employed, it is very likely that the prop would have shattered on impact and created far more severe damage to the launching KA-6 and those aircraft on the deck.

Investigation revealed that the ship had no written pass-down for launching clearances from adjacent catapults for different mixes of aircraft prior to this incident. All carriers need to review catapult spotting and launching clearances for different mixes of aircraft *and then put it down in writing for pass-down.*

Waistcatmouse

Stop Your Turn

THE ship and the plane guard were steaming independently from the rest of the force in a blue water environment, with E-2 and S-3 operations being conducted from 0500 to 2100, and the rest of the air wing flying from 1300 to 2100. Prior to launch/recovery of the E-2 and S-3, the ship commenced a competitive drill in which it conducted abrupt heading changes at irregularly timed intervals.

As the relieving E-2 launched from catapult No. 3, the ship commenced an abrupt starboard turn, heeling rapidly to port during the catapult stroke. This resulted in the E-2 leaving the angle with a downward vertical velocity and slightly left wing down.

The bridge team eased rudder in a

belated attempt to damp the heeling motion of the deck. The aircraft settled dramatically with the dome barely visible from the flight deck. The aircraft commander quickly cross-checked engine instruments, decided that the trim settings had been erroneous, and attempted to rotate the nose of the aircraft further. At the onset of rudder-shakers, yoke pressure was eased as they decided to bite the bullet and pray for the best. Ground effect and the good Lord provided.

At the request of the captain, the OOD reported to the E-2 readyroom to explain the steps taken to improve coordination and communications on the bridge. The point that carrier operations are complex evolutions requiring close coordination of many agencies by the bridge team was impressed on both bridge watchstanders and squadron personnel.

Almostwetmouse

Do As I Say

AT approximately 1300, a pilot picked up a UH-1N at MCAS New River. The aircraft was due to be ferried to Davis-Monthan AFB. Although it is squadron policy to wear eye and ear protection on our line when aircraft are turning, this pilot, when informed of this by a plane captain, refused and remarked that it was not his squadron's policy.

The pilot, a Navy captain, then sauntered out to the aircraft wearing nothing on his head. He then started, taxied, and took off wearing a headset instead of a helmet and no gloves – both practices in direct violation of

NATOPS and OPNAV 3710.7H. Besides indulging in unsafe practices, this senior officer's flagrant lack of respect for established safety regulations set a poor example that was visible to many of our officers and enlisted personnel.

Longwaymouse

UNCHAINED MELODY

TWO A-7s were spotted for the first launch of day carqual ops. *Corsair* 300 was spotted on the foul line facing starboard, while *Corsair* 302 was located on the No. 2 elevator facing to port. The ship had a 2-degree starboard list. The deck was dry and steady. As you probably have already guessed, these two aircraft were soon to be involved in a crunch – although this was to be a new variation on that old theme.

Aircraft 300 was about to be started when the huffer was diverted to a waiting E-2 that had start priority. As launch time neared, the flight deck chief, thinking 300 had started already, approached the plane captain of 300 and gave a thumbs-up/thumbs-down signal to inquire if the aircraft was ready for launch. The plane captain responded with a thumbs-up signal followed by a two-finger turnup to indicate the aircraft was ready to start. The flight deck chief didn't see the two-finger turn signal and passed to a nearby taxi director that 300 was ready to go to the cat. Shortly thereafter, the flight deck director approached the aircraft from the port side and passed the "hold brakes" signal to the pilot, followed immediately by a breakdown signal to the blue shirt personnel. The plane captain had moved to the other side of the aircraft to await starter hookup.

Upon observing the director give the breakdown signal, the plane captain began to shout and signal that the aircraft needed a start. The pilot in the cockpit also tried to yell to the director – to no avail. The end result was that the four chains attached to the mainmounts were removed without the aircraft being started – and without brakes. The emergency brake and utility hydraulic accumulators had both been bled as part of normal daily inspection servicing procedures.

With no chains attached, the chocks were expelled laterally by the aircraft tires. Several deck personnel tried to reinsert the chocks as the aircraft started to roll, with no success. The runaway A-7 continued to roll and accelerate until it impacted aircraft 302 on the elevator, intake to intake. Both aircraft sustained Delta damage.

Certainly one obvious cause of this accident was the yellow shirt's failure to obtain an affirmative head nod from the pilot certifying that he was ready to have the chains removed. During the investigation, the director admitted that he looked away from the pilot to give the breakdown signal before he received a positive acknowledgement from the pilot.

But there were quite a few other factors leading to this accident as well:

- The plane captain was not aware of the significance of passing a thumbs-up to the flight deck chief as launch time approach.
- The position of the plane captain in front of the aircraft intake should have been evidence to the chief that the aircraft was not started and was not ready to be broken down.
- The taxi director failed to get positive confirmation from the plane captain that all poststart checks were complete.
- The metal chocks failed to hold the aircraft, even at the low energy levels the A-7 had when the chains were first removed. The squadron felt the accident would not have happened if the chocks had been wood or rubber.
- Although the backup brake systems were not operative due to normal servicing requirements, this design feature of the A-7 brake system must share at least some blame for the accident. The inadequacy of the A-7's brake system with the engine not turning has been well documented and has been the source of many flight deck crunches.

The bottom line on this accident was that the ship appeared to be striving to operate at "Fleet Standard" pace, although the evolution was strictly training. Ships and air wings that try to rush the tempo of operations before a satisfactory level of proficiency is reached are just asking for senseless mishaps. The unchained melody in this episode was indeed a sad song. ◄

An Eventful Landing

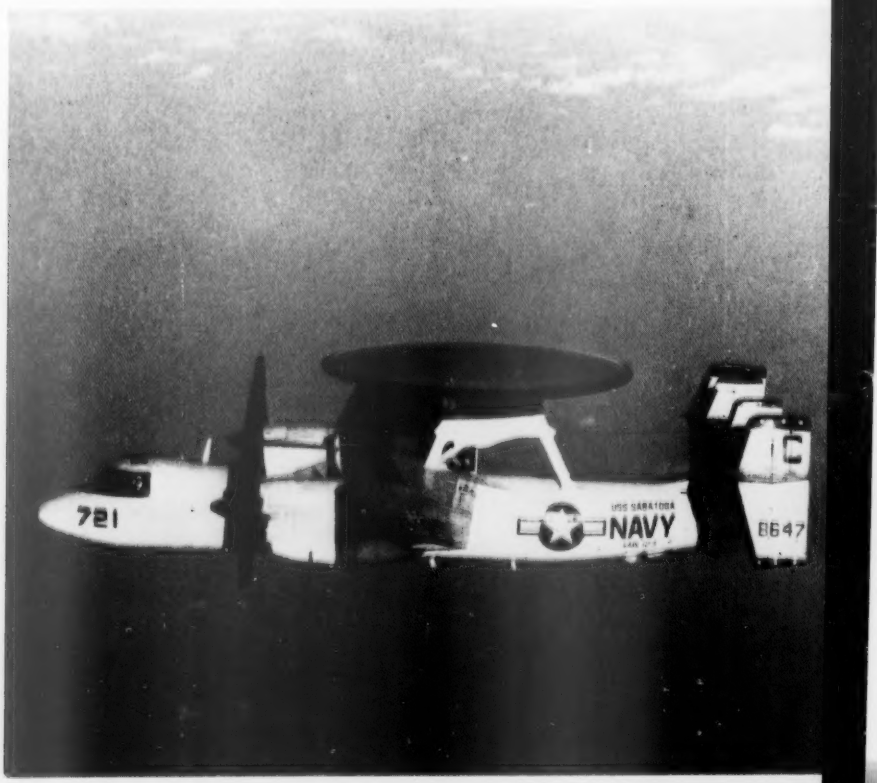
THE pilot of a C-118 waved off from a GCA and selected gear up, but only the nose gear came up – the main gear indicated unsafe. The crew checked the hydraulic quantity, which was normal, but the hydraulic pressure gage read zero.

Flaps had been set at 20 degrees and were left alone. The landing gear was lowered with the emergency system, and all gear indicated down and locked.

The TPC shot another approach and made a routine touchdown. All engines were reversed, but No. 4 went to full feather. To counteract that unexpected event, the TPC smartly brought No. 1 out of reverse and used it to control the swerve. With 2000 feet of runway remaining, nosewheel steering was lost. The aircraft was stopped with brakes and reverse pitch on No. 2 and No. 3 props.

Landing gear pins were installed on the runway, engines were secured, and the big transport was towed to the line. Upon securing the aircraft, it was noted that the prop reverse circuit breaker had tripped. The wing flap block had permitted movement of the flap actuating cylinder, which ruptured the attached hydraulic lines.

The flap block assembly failure is a known problem area, but was coincidental to the short in the No. 4 prop governor control assembly. The pilot had his hands full with the double problem, but was able to handle the situation with a minimum of sweat.



By LCDR Cameron B. Place
VAW-123

THE NEAREST SUITABLE FIELD

IT was a beautiful Friday afternoon – a perfect day to do a maintenance checkflight (test hop in those days) on an aging but venerable *Willie Fudd*. After completing the checkflight requirements, the crew headed back from the warning area to Homefield.

Shortly after passing overhead Elizabeth City Coast Guard Air Station, the oil pressure started dropping on the port engine. When it hit 40 psi, the engine was secured. Although the *Fudd* has never been listed among the world's greatest single-engine flying machines, this particular day was much closer to standard than hot, the gross weight of the plane was well below max, and the *Fudd* was already at altitude. But it was obviously time to make a decision.

A quick review of the pertinent factors affecting the decision was in order. First: The plane was maintaining altitude without difficulty – flying quite smoothly in fact – no doubt a reflection of the vast experience of the crew. That was factor number two, by the way. Both crewmembers were second tour with recent Fleet experience and well over 2000 hours spread between them. Thirdly: Although the CGAS was just behind them and easily the closest field, NAS Norfolk (East Coast *Fudd* Haven) was only 15 minutes in front of the nose and well within single-engine range of the wounded *Willie*. Fourth: Those dedicated men who fix the planes were located at Norfolk. No one at Liz City was qualified to repair an E-1B, especially on a Friday afternoon (factor five). Sixth: The weather, as mentioned earlier, was terrific. And finally, a bunch of minor considerations such as happy hour, a hail-and-farewell party, supper, and the waiting wives completed the list.

A decision was made. Three days later, squadron personnel determined what had occurred. The loss of oil pressure which resulted in the inflight securing of the port engine was quickly traced to a chaffed and ruptured feather motor oil line. It required a more detailed search to determine what had happened to the *starboard* engine. Eventually, though, the loose clamp on the return line to

the oil cooler was discovered. The line had vibrated loose and the starboard engine had pumped itself dry.

The above experience was recalled during a recent discussion involving emergency procedures which include the phrase "land as soon as possible" or "land at the nearest suitable field." I'm sure every NATOPS manual has at least one or two of these emergency procedures. When the problem arises, it is simply a matter of the pilot determining what constitutes a suitable field. To a helo hoverer, it may be a cornfield; to a *Fudd* driver – East Podunk Muni; to a *Phantom* Phlyer, the Space Shuttle landing strip may not suffice. Facilities such as approach aids, arresting gear, and firefighting equipment will affect the choice of emergency fields. Weather and crosswinds may eliminate other potential airfields. And certainly it would be nice if the runway were long enough to stop on and strong enough to support the aircraft. It should be obvious that to list all the factors and criteria affecting every situation would be impossible. It is possible, however, to eliminate certain "factors" from every situation.

Historically, the number one gotcha is get-home-itis. It encompasses a myriad of temptations from hot meals to happy hours, cool sheets, warm showers, and the tender attentions of wives and lovers. In the case of air wing fly-offs, get-home-itis includes every temptation known to man.

Another nonconsideration is tomorrow's flight schedule. In an emergency, the problem is not one of having the aircraft available to make tomorrow's ACM hop. The problem may be one of just trying to have the plane tomorrow. The pressure of operational commitments should not be a factor in choosing a suitable field.

Repeat gripes and faulty warning lights are a subtle and vicious threat to the health and long life of aviators and their machines. In the E-2 *Hawkeye*, it's the hydraulic system low-level warning lights. Like clockwork, two flights after a hydraulic jenny has been on the aircraft, one of the caution lights, will illuminate. The usual response from the pilot is "Ah ha, 15 seconds late this time!" Unfortunately, the plane also develops real leaks occasionally, and you can never be certain what you've got. Pass up a suitable field? Take a chance on it being another false indication? If something is really failing – depend on your backup systems? If you do, someday you'll make the WEEKLY SUMMARY. Besides, there's no such thing as a "faulty" warning light. Either there's a problem with the system or there's a problem with the warning circuit. In either case, there is a problem, and unless you can positively confirm a malfunction of the warning circuit by airborne troubleshooting, you had best treat it as a system failure, do your damndest to save the aircraft, and let the people on the ground who are trained and paid to fix things do their jobs.

Now that I have cleverly managed to bring that subject up, another non-criteria of a suitable field is the presence or absence of the bruised-knuckle wrench-turners who work diligently to keep our main means of airborne mobility working or fix them when they aren't. It is far easier and much less expensive to move the parts and personnel to some distant suitable field than it is to repair some nearby smoking hole. Do yourself a favor. Do the Navy a favor. But don't do maintenance a favor by passing up a suitable field while attempting to deliver a flying pile of faulty parts to the hangar door.

In the case of the venerable *Willie Fudd*, the decision was to land at Elizabeth City. The starboard engine drained itself all over the ramp. It cost the squadron an extra day to transport the troops and parts south to repair the plane. It cost me a restless night of "what if's." I discovered the starboard engine oil leak as I was putting on the ground locks. Before that time, there was no indication of the impending engine failure. The *Fudd* didn't have 15 minutes of flight time left in it. Liz City on a Friday afternoon is not all that bad a place to be. Besides, there was no way my wife was going to be ready for the party on time anyway.

BE A "BOAT" RIO

By LTJG John Fineran
VF-111

IT'S been 6 months since I returned from my first cruise (a Med cruise aboard the FDR). Flying off the "Rosie" was a great learning experience. After a few traps I developed a philosophy based on self-imposed demands and personal beliefs which I continually reviewed. The following are a few of them which you might want to consider.

Trust no one. After a couple of night traps, I developed an attitude of "never trust anyone." Everybody and everything (my pilot, the CCA controller, my aircraft, the cat, and arresting gear) were all out to get me. To survive in this environment, I took positive actions to improve my survivability. Do not assume anything; it may cost your life.

Be mentally prepared to fly. Mental preparation is perhaps the single most important factor in meeting the demanding requirements of carrier aviation. The night before you go to sea, mentally review an entire flight from the carrier. Despite this mental preparation, you'll probably be rusty for the first 10 minutes after the cat shot. My mental preparation greatly aided me through my first hop after a 2-week layoff.

"Feel the aircraft." The bounce pattern is not the most exciting way for a RIO to accumulate flight time. Nevertheless, prior to CQ, I availed myself of every opportunity to fly FCLPs with my pilot. After hundreds of touch-and-go's, I got a "feel" for how my pilot flew the ball, and how my airplane responded to power and attitude corrections.

Know your procedures. Flying around the carrier is a lot simpler if you know all the rules. The rules (NATOPS, CV NATOPS, LSO NATOPS, CAG TACNOTES) tell you where to fly after takeoff and how to recover onboard the ship. Launching 15 aircraft and recovering another 15 in approximately 30 minutes is standard operating procedures for carrier operations. For this demanding evolution to go smoothly, it is imperative that everyone know the rules.

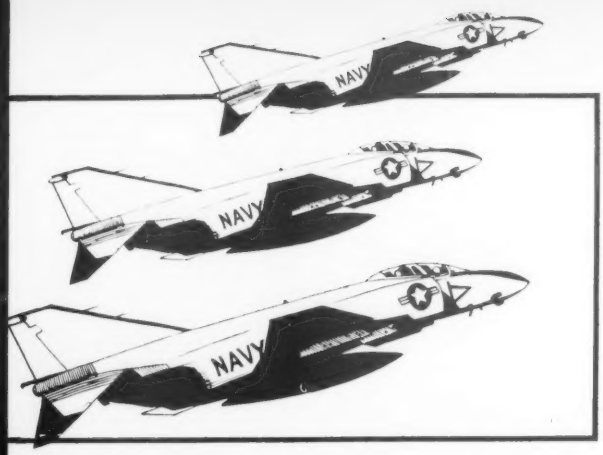
Know yourself and your pilot. Every naval aviator/RIO requires crew rest. If you fly without sufficient crew rest, your motor skills and concentration will be impaired. Know your physical limitations. On cruise, my pilot is my best buddy. Before we fly, I try to get my pilot in a good frame of mind. I try to make him happy, because he takes care of me while we are trapping and catting. Know your pilot: his weaknesses, his strengths, his aspirations, his family life, and his personal problems.

Know the divert field. Prior to the brief, I carefully studied the divert field in my stateroom. Could I, under the mental strain of a night bingo, find the field without mistake, without delay? I familiarized myself with the radar picture of the area surrounding the field and studied every facet peculiar to the divert field. Ask yourself the following questions: Is there a rotating beacon at the field? How will I set myself up for the runway? How long is the runway? What type of arresting gear is available? How far down the runway is the arresting gear? Are there English-speaking controllers? Is the runway lighted at night? Where is the TACAN in relation to the runway?

Demand a thorough brief. The hop always went better when I left the readyroom with a clear picture of our mission and the mission requirements. Brief (as a minimum) NORDO, weather, no navaids, section approach, hot areas, bingo fuel, and bingo profile. Sounds like "Have a plan and fly it," doesn't it?

Complete all checklists. I place great emphasis on the takeoff, penetration, and landing checklists. The F-4 "Boat" RIO needs to consider the following items prior to takeoff. Prior to crossing the shuttle, make sure you have proper pneumatic pressure for nose strut inflation, and the centerline has been checked full. The leading edge of the stabilator must be visually checked before your pilot salutes the cat officer. Monitor correct stabilator position as you roll down the cat. When you pass the bow, glance at the airspeed indicator to ensure your aircraft has flying speed. Look over the pilot's shoulder to see if the "master caution" light is illuminated. When your pilot rotates, check for proper rotation.

Be prepared for the worst. Even now, 7 months after the cruise, I get scared just thinking about a night cat shot. Rememorize the immediate action emergencies prior to



each at-sea period and be mentally prepared for each cat shot. I am not telling you to put your hand on the ejection handle during the cat stroke, but during the stroke, have your hands near the lower ejection handle and be prepared to eject if your aircraft experiences a catastrophic failure.

Think ahead. I hate being surprised, especially when flying around the carrier. I compartmentalize a sortie from the carrier, since there is a definite sequence of events. After the cat shot, we rendezvous with the tanker, then we practice intercepts. After this we go to the Marshal pattern, and finally trap. If you anticipate what will happen next, then you'll be better prepared to handle the unexpected.

Think fuel. Flying off the FDR made me appreciate the importance of fuel. Max trap (F-4) on the FDR was 5100 pounds. An 80 nm bingo (gear/flaps up) at night is 3700 pounds. Every ounce of fuel is precious. At night we were on the ball with 5100 pounds. Fuel was managed very carefully, and we never dumped to max trap until the last possible second. For example, let's say we arrive at Marshal with 7200 pounds at time 30. Marshal tells us that our push time is 40. The *Phantom* burns 100 pounds per minute at max conserve, and it takes 800 pounds to shoot the approach. Am I going to recommend that 300 pounds be dumped at time 35? Absolutely not! At time 38, Marshal may tell us that our new push time is 45. Fuel can be dumped (680 pounds per minute), but once dumped, it is lost forever. Fighter pilots don't enjoy tanking at night, especially after being airborne for 1.5 hours and facing a night bingo into a foreign field. Think fuel from cat to trap.

Don't be timid. If you get confused during a hop, ask your pilot what's going on. If you think your pilot is doing something strange or even stupid, ask him what he is doing. It is better to take this approach than risk flying into the water.

Be Cool. Everybody has an emergency now and then. When my pilot tells me that we've just had a utility hydraulic failure, I calmly pull out my pocket checklist. Then we go over the NATOPS procedures step by step. Why get excited? Take positive actions to ensure that everything is done correctly during an emergency. During an emergency, it is important to make clear, concise UHF transmissions. If you do this, the controllers will understand your desires and serve your needs more effectively.

Things will get worse before they get better. During an emergency, anticipate the worst. If you have a utility hydraulic failure, anticipate losing one of the PCs. If you have multiple emergencies, ask yourself the following questions: What is my bingo? Has my ability to climb/turn been effected? Will arresting gear be required at the divert? Will you be able to land aboard the carrier despite the emergency?

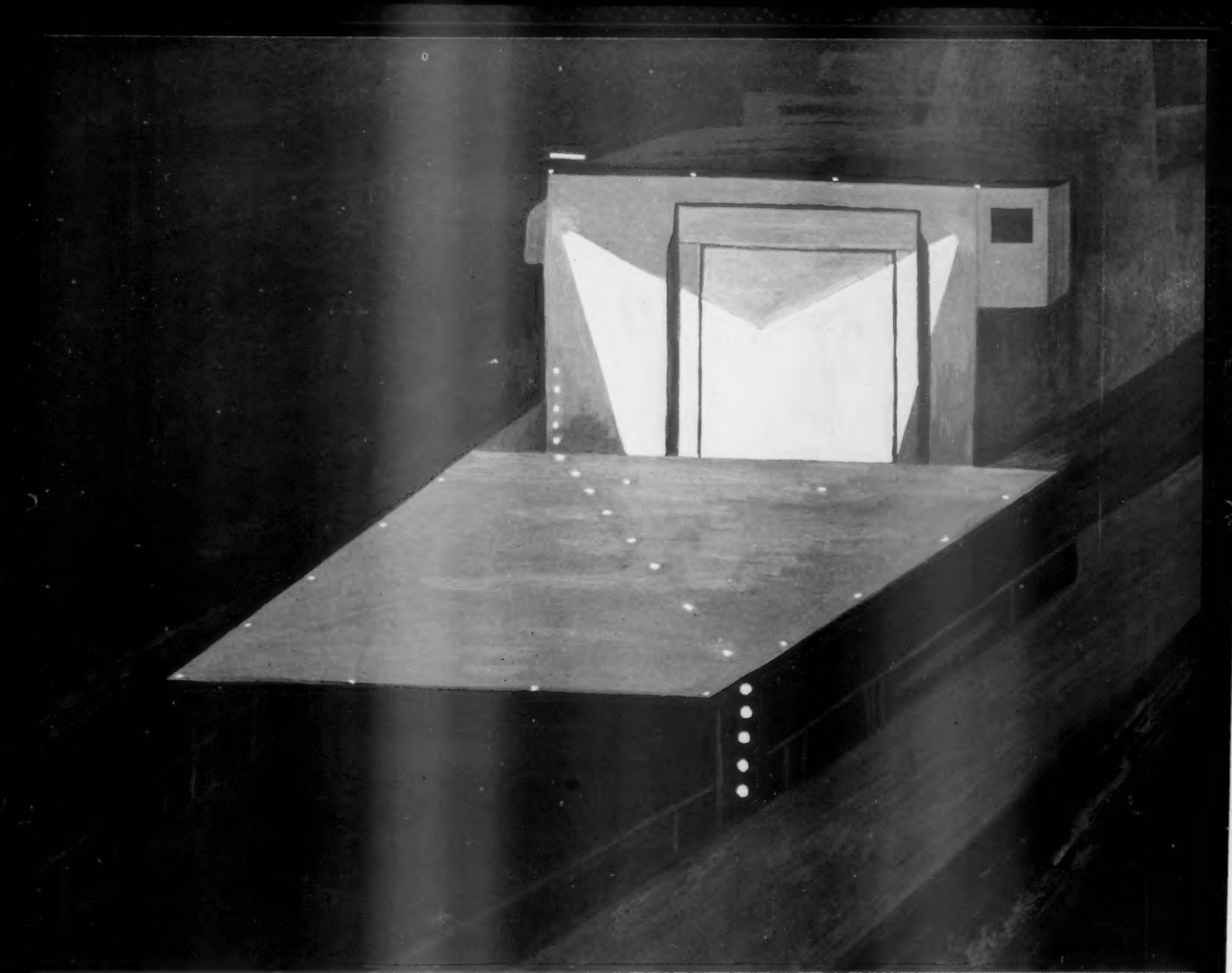
Put your pilot on the ball. My pilot liked a centered ball at 3/4 nm. My job was to help him get there. Here are a few pointers you can use to put your pilot on the ball: ensure the penetration and landing checklists are completed; share the responsibility for pushing out of Marshal exactly on time (remember, a 360-degree half-standard-rate turn takes 4 minutes); remind him to go "bright and steady" prior to departing the approach fix; use the radar to verify a proper TACAN lockup; be exactly on the final bearing, ensure the dumps are secured prior to 3 nm; back up the CCA controller (remember the "100-foot descent for every 1/4 nm" gouge); doublecheck that the gear, flaps, and hook are down prior to 3/4 nm.

Be careful around the boat. Some things must be done *now.* Some things can be done 2 minutes from now. I learned this after a night bolter when I fixated on my wingman's external lights instead of ensuring that we had proper rotation off the angle deck. The plat tape showed us going level off the deck for many, many seconds. If you know what is important and if you set proper priorities, then you will probably enjoy a long flying career.

Be willing to learn. I make mistakes, but I try to learn from them. My goal is to be one of the best "Boat" RIOs in the Navy. During the debrief, accept constructive criticism with an open mind. Don't let your ego keep you from being a better RIO.

Be a Boat RIO. The concentration required of a naval aviator between the Marshal pattern and engine shutdown is tremendous. The concentration required of a RIO should be the same. When we are in the Marshal pattern at night, I say very little on the ICS. My pilot does not want to be distracted with meaningless information, but I will not remain silent if a dangerous situation develops. Although the pilot has signed the yellow sheet, bringing it back to Homeplate in good condition is as much my responsibility as his. It is "our *Phantom.*" I believe in the *Crew Concept.*

Flying off the boat is extremely satisfying for the RIO. If you ever become an Ace, it will be off a Navy carrier. You have a vested interest in learning the skills of a "Boat" RIO; strive to be the No. 1 "Boat" RIO. ◄



VSTOL night approach

By LT G. P. Tierney, USN
HSL-34, Det 6
Air Officer, USS SPRUANCE

THE mission has ended for all practical purposes. The last contact was 60 miles from the ship, and shortly I'll be making a final approach. Fuel is adequate and, as usual, I'm hoping not to bingo. The carrier left the area 10 days ago, leaving my ship alone on station.

On the outbound leg, I call for foxtrot corpen. Control informs me that the bridge is having difficulty making the envelope. The weather, with high winds and heavy seas, has not been the best for the past 2 days. I had to accept marginal winds for takeoff just so the ship could get pitch and roll within limits. The radar operator reports several rain cells still in the area. I see the mast headlight at 2 miles. Still no foxtrot corpen. What could they be doing down there?

Then I hear: "07, this is Delta Zulu, foxtrot corpen 030 degrees, winds 010 at 25 knots, pitch 2, roll 8, altimeter 29.91, green deck." My first reaction is a curse. They have put me right at the edge of the envelope. Turning outbound, I realize that the ship's OOD is doing the best he can with the wind and sea. He wants me down safely as

much as I do. After all, he's my roommate, and I owe him five bucks.

At 400 feet, my radar operator vectors me to the 2-mile gate. Transitioning to approach speed, I report the gear and crosscheck the engine gages for the last time before touchdown.

My crewman says, "Steady up 005, 2 miles to touchdown." Followed by the copilot reporting, "I have the deck visually." Ahead I see three small, faint lights and guess the highest one is the mast, another is a deck light, and assume the pink-looking one is the vertical droplight. Small ships are hard to see in the daytime, and even more difficult at night.

The copilot reports instruments checked and that we have enough fuel for one or maybe two waveoffs if things get really hairy.

As my crewman calls 1.2 miles, I start down and slow to 60 knots. I can now see the GSI (glide slope indicator) and the strobe lineup lights. I feel high and slightly right.

"Three-quarters of a mile, come right to 360," I hear the back seater say. I'm now at 275 feet and 40 knots and preoccupied with the closure rate. I'm lined up, and the GSI bar shows amber (good). The lighted outline of the deck is visible in the lower edge of the front windscreen, and I have to strain forward in the seat to keep it in view. The nose of the aircraft creeps upward as I gradually trim back to a slower airspeed.

It has been 90 seconds since I hit the 2-mile gate. The GSI goes red, and I add power and check the radar altimeter. It reads 170 feet. Too low! I have to be careful not to change the ever-increasing angle-of-attack, just add a bit more power.

My radar operator makes his last transmission. "You're now one-quarter mile, on lineup."

From now on, it's up to visual references and the LSE. I crab right wing down to keep the aircraft from drifting behind the lineup. My eyes are busy checking the flight deck, scanning the GSI, watching my lineup and droplights and even the ship's stern as I try to keep from getting vertigo. I add power in anticipation. The aircraft begins to buffet and wallow. We're in the "hole," and I have to lower the nose a tad and push on through. Once out, I quickly pull back stick and ease off some power to maintain the same well-natured closure and sink rate. The maneuver is complicated by turbulence from the ship's sail area and from the mast and stack.

Two dimly lit wands and the hangar face lights come into view – directly in front of us. There are no straight-ahead waveoffs on small decks. We're now 75 feet above the water, and the closure rate is miniscule. Yet, I'd swear I'm too fast. But the LSE keeps waving me in.

I inched the aircraft forward and down. The hangar face looms ahead, larger and larger. Slowly it grows to cover the entire forward windscreen.

Entering the transition at 40 degrees from the windline, right wing down, I watch unbelievingly as the LSE still motions me forward and down. But I have faith in his abilities and, ever so gently, I ease the stick forward and reduce power. The LSE continues to beckon me.

I ease over the deck at 35 feet on the radar altimeter, and the salt spray covers the windscreen like rain. It blurs my vision, but the windshield cleaners are quickly turned on, and I can see again. The aircraft is within 35 feet of the hangar. The hangar doors – swaying back and forth – are right in front of me. The deck reference lights are now below us and out of sight. The LSE remains the primary aid to a safe recovery. The ship is pitching and rolling so that even a perfect hover may not ensure success. Three and a half minutes have elapsed since commencing the approach.

I hover over the small landing circle and can barely see the wands of the LSE at the bottom edge of my field of vision. The tailwheel is too close to the flight deck edge, so the LSE asks for a left hover turn. Movement of the pedals coupled with yaw of the ship causes the aircraft to slide away. I overcorrect and begin to oscillate. My hand tightens around the stick. The LSE calls for a steady hover while I struggle to stabilize the aircraft. I consider applying left pedal and back stick, adding power, easing over the deck edge, and getting out of there. But, I stop bobbing, keep sight of the LSE, and restabilize. The deck steadies momentarily, and that's all I need. The LSE signals land. As soon as I touch down, four chock and chain runners whip out to the aircraft and tie me down. For the first time in almost 5 minutes, since starting the approach, I begin to relax and then complete the shutdown checklist.

What I have described is not fictitious. It's a lesson in concentration, months of training, a silky feel on the controls, flashing eyes, crew coordination, and many other things. It's being flown night after night by LAMPS pilots aboard frigates, destroyers, or any ship with a helo platform. Tomorrow, however, it may be flown by a vectored thrust, augmented wing, tilt wing, tilt rotor, or another variety of aerodynamic creation. Regardless, the basic relative motion problem of an airborne vehicle alighting on a ship remains the same.

The LAMPS community has expanded the night, VSTOL approach and landing. The evolution is still far from perfect, but if the present state of the art is to develop and incorporate more sophisticated vehicles, several air communities will have to pool knowledge and experience.

Transition to other types of VSTOL can be made safely, and Fleet readiness can be extended, but only if early lessons learned are applied at each progressive step. Let's not reinvent the wheel – it's too expensive! ◄

Letters

Hook 'em Up Yourself

MCAS Yuma, AZ – I strongly disagree with the recommendation by Detachedmouse ("Things Go Better with Koch," JAN '78) that plane captains actually hook up the upper koch fittings for pilots. If pilots get into the habit of always attaching themselves, the problem would be solved. The fact that a number of fatalities have resulted from being detached from the parachute and that plane captains were not available or trained to assist the pilot seems all the more reason not to depend on them. Many of us habitually fasten our own fittings *every time*. The plane captain, if present, can doublecheck if he wants to; however, one's own life is now guaranteed by the person to whom it is closest, and the illogic of depending on someone else when it isn't necessary is eliminated.

Capt L. L. Nicholson, USMC
VMAT-102

TILT

NATC Pax River – I would like to take this opportunity to clarify some facts with respect to the dynamic tipover phenomenon as per Capt Cress' article in the JAN '78 APPROACH. First, you can go TILT on perfectly level ground as in the accident which is the subject of the "Inattention" article with which I am familiar. You can even roll it over from a standing start during takeoff if you don't watch your Cs (cyclic and collective). Secondly, correlation of dynamic tipover discussion with the slope landing problem was done initially here at NAVAIRTESTCEN because of the similarity of helicopter response in the two situations. These similarities arise for four reasons: 1) transfer of the roll center of the helicopter from the CG to the wheel (or skid); 2) change in roll inertia, thereby changing roll response to lateral cyclic input (*see note below); 3) presence of large ground reaction forces; and 4) use of the collective for control of roll angle.

In the slope landing case, the ground reaction force (and hence rolling moment) is attributed to a vertical force on the upslope wheel while in contact with the ground. This is a straight forward case and easily understood by all. The fact that causes confusion in the dynamic tipover is that there can exist a side load on the wheel in contact with the ground. This side load doesn't obey the standard normal force times coefficient of friction law, and can be substantial. It creates the same sort of rolling moment on the airframe that the slope landing does. In the accident cited in the "Inattention" article, the aft portion of the right skid hit and dug into sod, making a rather sudden stop and TILT. A substantial side force was created on the skid, causing a rolling moment on the airframe.

A third subject that should be addressed is the susceptibility to mast bumping or droop-stop pounding as a result of the application of recovery controls. At certain critical rollover rates, the combined action of full recovery control (lateral cyclic) and roll rate drive the rotor blades to mast bumping or droop-stop pounding. When this occurs the bumping or pounding forces will take control of the rotor system from the pilot and tilt the tip path plane (through gyroscopic action) forward or aft, depending on direction of roll, and drive the blades into the ground. This roll rate, for example, is 10 degrees per second for the OH-58.

Proper use of the collective is the fourth and final item for discussion. While correctly stated in the "Inattention" article, which is a dynamic tipover situation, the description of proper technique is not reiterated in the "Done In: Dynamically!" article nor in any of the NATOPS manuals. The "Inattention" article states: "It's possible [that] he could have prevented the rollover with immediate, full down collective and left cyclic application." I am as big a proponent of smooth, moderate, etc. control inputs to keep pilots out of trouble; however, in this dynamic tipover situation, smooth, moderate collective control application will buy the pilot a multifragmented rotor system and helicopter. When in doubt – dump it, as fast as it will go down. If you are making a normal slope landing, use smooth, moderate collective inputs. By way of illustration that the recovery technique for dynamic tipover works, a former NAVAIRTESTCEN test pilot told me of the time in 'Nam when he was operating a *Cobra* out of a revetment, and he was looking out to the side as the copilot lifted off. "When the tip path plane got to 1 foot from the ground, I couldn't stand it any longer and grabbed the controls and went full opposite lateral and full down collective immediately. The helo rolled back and squatted – didn't even bounce."

Herman G. Kolwey
Head, Air Vehicles Section
Rotary Wing Aircraft Test Directorate

*Note: The equation $H = mr^2w$ stated in the article is actually only the *change* in angular momentum. Its true momentum would be $Iw + mr^2w$ or $H = (I + mr^2)w$ where I is the basic roll inertia of the helicopter. The resultant angular momentum with a wheel in contact with the ground increases by a factor of 6.4 for the SH-2F, 7.8 for UTTAS, etc. It is no wonder that roll rates are dangerous since the

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airframe now has seven times the roll inertia of a free-flying helo.

P.S. SH-2 static rollover angle should be 28 degrees vice 78 as indicated in Fig. 1 of the article, and its critical angle is 15 degrees.

● You caught us in a typo goof. See next letter.

NS Mayport, FL – Your article "Done In: Dynamically!" in the JAN '78 issue gives the SH-2 a static rollover angle of 78 degrees, which is a trifle on the high side. The SH-2F NATOPS Manual (pg. 4-3) yields a static tipover angle of 28 degrees and a dynamic tipover angle of "around 15 degrees." Additional caveats state that "cases can exist in which the helo will turn over from a level attitude if high sideward velocity exists at touchdown," and that "slope landings or takeoffs should not be attempted on slopes of higher angle than the lateral control capability of the helicopter (12 degrees)." Using your definition for critical rollover angle, a figure of 12 degrees would seem appropriate for the top-heavy SH-2F. Dynamic tipover angle would vary with roll rate, thrust, weight of helicopter, offset distance, etc.

LCDR T. A. Gibson
HSL-36

If Fire Persists . . . EJECT!

Warminster, PA – The recent fatal F-14 accident has pointed out a possible flaw in the emergency procedures for an inflight fire. Interim Change No. 30 to the F-14 NATOPS Flight Manual has deleted the final step: "If fire persists, EJECT."

Several years ago, an F-8 and its pilot were lost when the pilot failed to eject from his burning aircraft but tried to land it instead, much as in this recent accident. The NATOPS procedure at that time did not mention ejection either, but it was subsequently changed. With this previous experience in mind, I queried the F-14 model manager, via VF-101, concerning the rationale behind IC No. 30. The reply indicated that much discussion and soul searching centered around this very topic, but the decision was, "When the time comes to eject, the crew will know it; no mention of it need be included in NATOPS." There were certainly other factors influencing this decision, but in any case, it appears that lack of this important step in the procedures is tacit approval to get it back on the runway. To quote the NATOPS Manual, "NATOPS is not a substitute for sound judgment." Bearing this admonition in mind, would it not be better to allow the pilot the prerogative to land a crippled aircraft in violation of NATOPS if the circumstances should warrant, rather than give him no (or tacit) direction at all?

The dangers of flying a modern jet with such an emergency need no repeating; too many critical systems are vulnerable to an inflight fire. It is my considered opinion that, as the Manual previously stated, the procedure be amended to read:

"8. If fire persists . . . EJECT."

LCDR C. J. Pierce
Director, VF/VA Programs
Naval Air Development Center

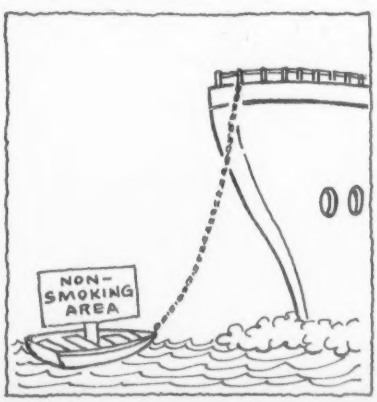
Isolation Valve Suggestion

Norfolk, VA – I read with interest your article on A-7 flap handle mispositioning mishaps (Up, Down, Isolate – Pick the Right One!) in the JAN '78 issue. After reading the section about pilots who landed with the handle in the ISO position, a thought occurred to me. Why couldn't that isolation valve be wired in with the weight-on-wheels switch, so if the pilot does forget to come out of ISO after landing, the valve will automatically open and prevent loss of the hydraulically operated components. I'm not an engineer, but it seems that this could be done – and maybe it would save some aircraft.

Jim Simmons
NARF Norfolk Quality Assurance

Where There's Smoke, There's . . . Unpleasantness

NAS Norfolk, VA – When the problems of one individual start to affect the welfare of another individual, some corrective action must be called for. Smoking is a problem. Although people who smoke will argue their right to do so, they do not have the right to endanger other people's health. It is now known beyond a shadow of a doubt that it is detrimental to a person's health to smoke. The Surgeon General has proven this fact time and again. Also, it is damaging to nonsmokers to be subjected to confined areas where heavy smoking is going on. Another proven fact is that the smoke inhalation from "secondary smoke" by nonsmokers can equal the intake of up to one pack per day.



I know that many branches of the government, some activities in the armed forces, and many concerned civilian organizations have implemented programs to protect the rights of nonsmokers. We have nothing like this in my squadron. Nonsmokers like myself are subjected to breathing other people's byproducts. Recently, the problem became so intense that I was forced to leave my shop with tears in my eyes while gasping for breath.

How do I go about establishing a program in my squadron? I believe there should be no smoking in confined areas where we are sometimes required to be, or places designated for squadron enjoyment such as the coffee mess, training room, wardroom, and various shops. All of us who are trying to keep our health must not be hindered in doing so.

AT2 William D. Welborn
HSL-34

● There *are* guidelines established within the Defense Department to protect the rights of nonsmokers. DOD Instruction 6015.18 provides the guidance. According to the instruction, the following areas are to be designated nonsmoking areas: 1) auditoriums; 2) elevators; 3) shuttle vehicles; 4) conference and classrooms. Additionally, the instruction urged establishment of nonsmoking areas in eating facilities and restriction of smoking in medical facilities to private offices, lounges, and specially designated areas. As far as work areas, the instruction states: "Smoking shall be permitted in common workspaces shared by smokers and nonsmokers alike only if ventilation is adequate to remove smoke from a work area and provide an environment that is healthful." As a general rule, a minimum of 10 cubic feet of fresh air per minute per person is considered adequate.

Your action should be to discuss the problem with your squadron safety officer. He may be able to work out a plan to provide nonsmoking areas in the shop or restrict smoking to certain areas in the squadron. Your Human Goals Council is another way you can bring the problem to your command's attention. ◄

approach

Vol. 23 No. 9 NAVAIR 00-75-510

CONTENTS

DEPARTMENTS

Pg. 1

Pg. 14

Pg. 24

A Naval Safety Center Publication

Our product is safety, our process is education, and our profit is measured in the preservation of lives and equipment and increased mission readiness.

PURPOSES AND POLICIES/APPROACH presents the most accurate information currently available on the subject of aviation accident prevention. Contents should not be considered as regulations, orders, or directives and may not be construed as incriminating under Art. 31, UCMJ. Photographs used to illustrate articles in APPROACH do not necessarily reflect the actual aircraft, air stations, ships, and individuals that are described in the text.

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CREDITS/The TAV-8A plays an important role in the safe introduction of pilots to the VSTOL regime. This month's cover painting is by staff artist Blake Rader.

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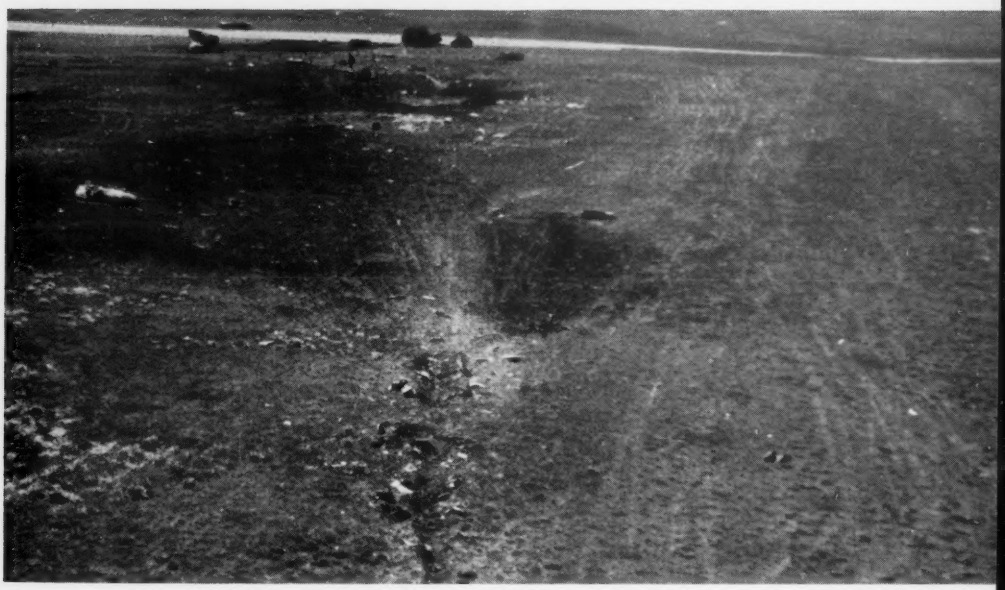
Q.

Is aviation safety awareness all that it's cracked up to be?

A.



Lack of aviation safety awareness is all that it's cracked up to be!

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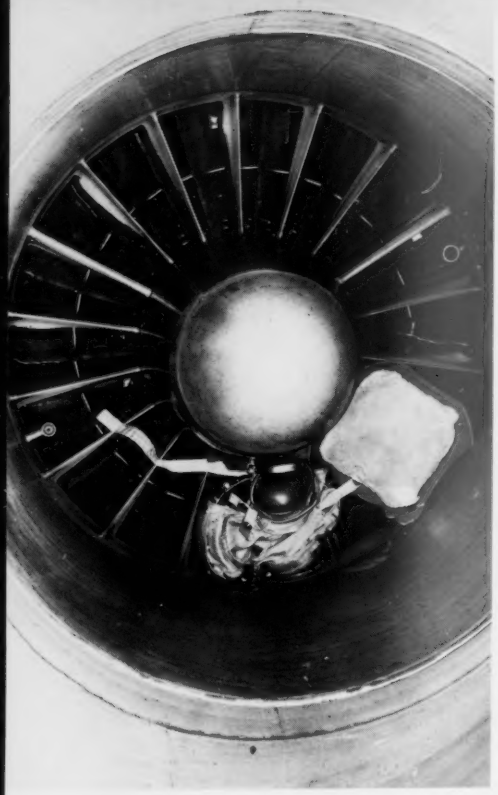

FOREIGN OBJECT DEBRIS IS FUTURE OPERATIONAL DISASTER

FOD

Idea submitted by
Cpl S. M. Pinkett, USMC
MAG-29.

C81-G1-278

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